universität wien

Magisterarbeit

Titel der Magisterarbeit

"Spatial distribution of Austrian inward Foreign Direct Investment"

Verfasserin

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angestrebter akademischer Grad

Magistra der Sozial- und Wirtschaftswissenschaften (Mag.rer.soc.oec.)

Wien, im Juni 2009

Studienkennzahl lt. Studienblatt:	A 066 913
Studienrichtung:	Magisterstudium Volkwirtschaftslehre
Betreuer:	ao. Univ.-Prof. Mag. Dr. B. Burçin Yurtoğlu

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INTRODUCTION

In last few decades, the world become smaller, transport costs are reduced, trade barriers disappeared and information became less expensive and became itself an internationally traded product. All this has facilitated the growth of multinational enterprises (MNEs)[1] that are essential agents in the world market place. Foreign owned MNEs employ one worker out of five in European manufacturing. They sell one in every four of manufacturing goods in Europe (OECD, 2001). Thus, they are "a fundamental feature of modern economies and there is no evidence that their actions are generally less beneficial to home and host economies than are the actions of national firms" (Navaretti & Venables, 2004, p.2).

Due to lack of specific cultural ties to individual nations, MNEs are probably the most mobile among all firms. They can rapidly enter and exit countries, motivated only by economic incentives. They seize a profitable opportunity when it presents itself. The recent growth in FDI[2], which at the moment is growing faster than international trade, suggest that MNEs become decisive in at least some of the agglomeration and dispersion trends going on today. The importance of that issue manifest itself through uneven distribution of FDI among the world but also across countries' regions. The empirical analyses, concerning countries and regions, detect that FDI are geographically concentrated more than other types of an economic activity (Shatz and Venables, 2000).

Hence, the location choices of MNE become very important for countries, their regions and their growth. Inflow of FDI is treated as a sign of attractiveness and competitiveness of a given region. The uneven regional growth widen the development dispersion within the country. In order to be able to design policies that attract investments, it is necessary, that countries understand forces shaping regional distribution of FDI, understand why some counties have seen more MNE activity than others.

The author of this thesis understands the significance of this phenomenon, thus she undertakes study of spatial patterns of FDI across the Austrian provinces over the period 1996-2006. Another reason for this analysis was the fact that sub-national studies of this issue are still very rare. Moreover, to the author's knowledge, there exists no study investigating the regional determinants of the location choice of FDI in Austria. Therefore, the goal here is to fill in this gap in the theoretical and empirical literature of the New Economic Geography.

1 The MNE is here defined as a firm that owns and controls productive assets located in more than one country (Caves, 1996).

2 Foreign Direct Investment

The main purpose of this study is to assess the relative importance of various types of determinants for the location of foreign firms within Austrian counties and to reconcile the findings with these of existing literature. In doing so, the study may be useful for regional policies aimed at attracting FDI and regional inequalities. The thesis examines regional differences in receiving FDI in Austria and agglomeration effects. The knowledge on agglomeration economies determinants is very important for being able to induce further investment in the future. The size of the country and the division on nine small regions may allow detailed analysis of this issues. Due to the classification of the capital as a separate county, there is possible also the analysis of the capital city effects on geography and agglomeration patterns.

The author of this thesis examines empirically hypotheses that agglomerations effects matter in localization of FDI within 9 Austrian provinces (Burgenland, Vienna, Upper Austria, Lower Austria, Styria, Salzburg, Tyrol, Carinthia and Vorarlberg). Thus, FDI concentrates where it has already flowed and close to suppliers and consumers. Moreover, the costs of factors of production, for example wage paid to employees, matters. A location is the more attractive the lower costs of international activity are.

Hence, the specificity of Austria as a country make this study even more interesting. Austria is a relatively small country on the edge of developed Europe. Its international environment has been changing significantly over the past few decades. The economic and political changes in Central and Eastern Europe Countries (CEECs) have been affecting in some way the Austrian economy. For a long time it was a state that was on the border of "Iron Curtain". The opening of CEECs encouraged factor flows from Western countries more and more interested in transition economies. For a long time Austrian Eastern border was the border of the EU. Currently, because of most of this countries accession into the EU, Austria becomes middle country of the EU and surrounded from almost all sides by the members of the EU (exception is the border with Switzerland).

The analysis of the mentioned issues is conducted using Poisson regressions that utilizes panel structure of the dataset. It also includes the phenomenon of count dependent variable which is a number of multinational firms. The multinational firms that are profits maximizers are assumed to choose one of the alternative Austrian provinces. However, they undertake that decision based on previous informations. Thus, the analysis assumes that investor engages in FDI on the basis of lagged indicators. Therefore, the research using observations over the period 1996-2006 covers 10 years instead 11.

Since the FDI are the subject of this study, there is need for identification of its

definition. According to IMF (1993), Foreign Direct Investment (FDI) is an investment in a foreign company, where the foreign investor owns at least 10% of ordinary shares, undertaken with the objective of establishing a lasting interest in the country, a long-term relationship and significant influence on the management of the firm. FDI flows include equity capital, reinvested earnings and other direct investment capital. Multinational firms undertake FDI by creating, acquiring or expanding a foreign subsidiary. Nevertheless, FDI may appear without a single corporation carrying the business in more than one country (so without MNE). However, as Caves (1971) suggests that it is rare. Thus, despite some conceptual differences, the terms FDI and MNE are here used as if they are synonyms.

The reminder of this thesis is organized as follows. The chapter I surveys the relevant theoretical (section 1.1.) and empirical (section 1.2.) literature on the MNE and its location. A separate section is provided for the previous empirical studies on Austrian FDI. In the chapter II general and regional patterns of FDI are viewed. The subsequent chapter starts with presentation of the theoretical framework that serves as a benchmark for empirical analysis in this thesis (section 3.1.). Section 3.2. presents the research hypothesis, driven from theoretical model and previous empirical literature. The chapter III includes in section 3.3. the discussion of the empirical methodology of the Poisson Regression Model. Section 3.4. describes the dataset and variables used in the model. Next section of this chapter presents the empirical results. Finally, last part of this academic paper concludes with final remarks.

CHAPTER I. FDI AND ITS LOCATION

1.1. Theory on multinational firms

Multinational enterprises (MNEs, multinationals) are key players in the world economy. The scope of multinational firms' activity and the range of actors affected by their existence in the international arena make that phenomenon very complex and broad. Hence, it is not a surprise that the theoretical and empirical literature covers a wide range of issues. Often, they are based on different sub-areas of economic theory, such as macroeconomics, growth theory, industrial organisation theory. This study particular interest is to present how MNEs were added into theoretical considerations during last few decades.

Multinational activity has grown at rates well above the global economic growth or global trade. Consequently, the literature on trade has attempted to incorporate this mode of accessing foreign market into the theory (Helpman et al., 2004). Early theoretical analyses put MNE into the neoclassical framework of perfect competition with constant returns to scale, product homogeneity, firm boundaries and indeterminate number of products. Therefore, firms were not identified as distinct from industries. As Brakman et al. (2001) pointed out, the neoclassical trade theory argues that trade flows between nations are based on comparative advantage, resulting from two sources; technological differences (Ricardo) and factor abundance (Hecksher-Ohlin).

MNEs were viewed as a part of the Portfolio Investment Theory. Direct investment was not differentiated from portfolio investment. FDIs, seen here as a cross-country capital flows, were motivated by cross-country differences in returns of capital. MNEs here play a role as an intermediary. The model assumes that multinational firms emerge as headquarters in capital-abundant countries and establish a subsidiary in capital-poor countries (Markusen & Maskus, 2001). Dunning and Rugman (1985) conclude that there is no role for MNE in this model because capital is transferred between independent buyers and sellers. Moreover, the flow is only a movement of capital from country to country, from where it is abundant to where it is scarce and it does not incorporate movements of FDI across industries, countries with similar factor endowments. That makes theoretical and empirical studies inconsistent.

The first step in making theory and empirical research coherent was separation FDI from portfolio flows of homogeneous capital by Caves (1971). Caves posits that direct flows are attributable to firm specific capital such as equity capital, entrepreneurship and technological or other productive knowledge in an industry specific package. Thus, national

endowments of equity capital need not dominate or influence its actions and cross-country investment flows may appear between the same industries. However, this model is still based on neoclassical assumption and it does not motivate FDI between identical countries.

The next step in explaining world's trends in FDI was a move towards an analysis of MNE based upon the industrial organisation approach into trade theory. It gave rise to the new trade theory between the 80's and 90's of the 20th century. It draws attention to the transfer of nonfinancial and ownership-specific intangible assets. The new trade theory has changed neoclassical framework, incorporating increasing returns to scale and imperfect competition into traditional general-equilibrium models. Early analyses within this branch of the literature were studied separately on vertical FDI and separately on horizontal FDI. Vertical FDI appears when a firm splits its activity by function. Horizontal FDI, on the other hand emerges when a firm duplicate a subset of its activities.

The former strand, vertical FDI originates in Helpman (1984). His model is a modified version of Chamberlin-Heckscher-Ohlin's model of factor proportions difference among countries. Helpman (1984) models a single product firms within a framework of 2 countries, 2 sectors (X, Y) and 2 inputs (labour and general purpose input - H that can serve many plants without the need of being located in a plant, eg. management, marketing, R&D). Sector Y is constructed on neoclassical assumptions of constant returns to scale and perfect competition, homogeneous product. Sector X is characterised by the new trade framework of monopolistic competition and increasing returns to scale at firm level. It is based on two activities, a headquarters activity (management, R&D, blueprints, etc.) and a production activity. Both activities have different factor intensities and may be divided cross countries without any costs. Trade costs are assumed to be zero in order to eliminate cases where MNEs would invest abroad to save or avoid them. (Helpman, 1984) The assumption on trade costs also hold on following works by Helpman (1985) and Helpman and Krugman (1985).

Firms make cost minimizing location choices for different activities to maximize profits. In this way, enterprises take advantage of factor cost differences. Within the factor price equalisation, when countries are identical, there is no incentive for activity fragmentation, engaging in FDI and setting up multinationals. There are no cost differences to exploit. Models on vertical integration predict that FDI should only be transferred from skill-abundant country to the unskilled country since firm's origin is identified with location of its skill- incentive headquarters.

Helpman (1985) and Helpman and Krugman (1985) represent a significantly more complicated models. Both papers introduce enterprises that are multi-product firms. However,

the former article deals with firms producing a range of differentiated final goods under factor intensities and the latter considers firms producing a range of differentiated intermediate goods needed for the production of final goods. Each variety is sold in both countries, thus there intra-firm trade occurs along with multinational production. Multinational activity is associated only with significant cross-country differences in relative endowments. Factor price equalisation again does not exhibit a role for multinational enterprises. (Markusen & Maskus, 2001)

Analysis on vertical models refers to single-plant firms that fragment the production process into stages based on factor intensities and that choose location under international differences in factor prices. All of these models provide a similar conclusion to neoclassical analysis. Namely, FDI and MNEs do not appear when countries are similar in relative factor endowments. They emerge more frequently as cross-country differences increase.

However, these models are based on rather the unrealistic assumption of no trade cost and no cost on coordination of fragmented activity. Shatz and Venables (2000) made an effort to remove zero cost of trade and coordination. Incorporation of transport costs of final goods results in the lack of equalisation of factor prices cross countries that strengthen incentives for activity fragmentation. On the other side, they implement the opposite force of non-zero costs of production process fragmentation that is disincentive of multinationality. The final conclusion on the appearance of FDI and MNEs depends on the interaction of these forces.

The alternative strand of the new trade theory on multinational is horizontal model of Markusen (1984). Horizontal integration describes a firm with a plant that produces the same good in multiple locations and serves local markets by local production. The model assumes two countries (home, host), two sectors (X, Y) and two factors of production (labour, resources). Products produced in the sectors are homogeneous. Labour is specific to the production of only one sector (Y). Markusen (1984) also includes fixed costs expressed in terms of labour that may be firm or plant specific. The author does not omit the existence of transport costs and thus, deals with unrealistic assumptions of vertical models. However, they are attributed only to the products of the sector X. Two-plant enterprises have fixed costs that are less than double that of a single-plant firm, which motivate multinational production. This model presumes that there are firm-level scale economies which, with trade costs, stimulate FDI flows. These scale economies at firm-level when large suggest that the firm will be larger and therefore, tend to have sales in many countries (horizontal integration). At this point, it is worth mentioning that large scale economies at the plant-level drive different conclusions. In the latter case, the firm will not want to divide production into many separate units.

Multinationality, then, is more probable when there are high scale economies at firm-level and relatively low scale economies at plant-level. (Markusen, 1984; Markusen & Maskus, 2001)

The presented model is extended by Horstmann and Markusen (1992). MNEs in these models tend to appear when firm-level scale economies and are large relative to plant-level scale economies and trade costs are also large. In paper by Markusen and Venables (1998) multinational enterprises arise endogenously. Markusen and Venables (1998) present a general equilibrium framework that allows a comparison with the Helpman-Krugman vertical model and additionally considers the role of asymmetries between countries. There are four types in the two-country model: national enterprise in home country, national enterprise of host country (both single-plant), multinational that originates in a home country and multinational that originated in a host country (both multi-plant). A multinational a firm with one-plant abroad is here removed by firm with two plants. The headquarters and one plant are located in the home country because of a connection between production and research. A second plant is located in the host country. This scheme is used to present a relationship between technology, country characteristics (market size – income, factor endowments) and trade costs. The importance of MNEs in total activity grows relative to trade when countries have similar in income (size) and in relative factor endowments and when world income total is high. MNEs shift production toward the countries with smaller or scarce in the factor that is used intensively in the MNE sector. Dissimilarity in relative endowments disincentive MNE and therefore, the horizontal models predict the absolute skills differences should affect FDI negatively. Relatively to exclusion of MNE, both countries gain in that case. (Markusen & Venables, 1998)

A significant step in the theory of MNEs was the Knowledge Capital Model formalised and developed by Markusen (2002). This breakthrough model combines two previously separated approaches of horizontal and vertical models into one common model. The knowledge capital model has two countries (i, j), two goods (Y, X) and two factors (L – unskilled labour, S – skilled labour). The good Y, which is unskilled-labour intensive, is produced with perfect competition and constant returns. X, on the other hand, is a homogeneous good that is produced with increasing returns and oligopolistic competition (Cournot) where multinational production may arise. There are scale economies at plant-level as well as at firm-level and transport costs are not zero.

Markets are segmented. The knowledge capital model allows firms to choose among three strategies: domestic, horizontal and vertical strategies. The former option is presented by single-plant firms with headquarters and plant in the same location. Horizontal strategy

represents two-plant firms with headquarters in one country and a plant in the other country. Vertical integration, on the other hand, is identified with single-plant firms with headquarters and plant in different countries. Thus, the integrative approach combines both multi-plant scale economies and the exploitation of factor price differences. Headquarters activities are more skilled labour intensive than production plants. Moreover, horizontal multinational firms are more skilled labour intensive than vertical multinational firms and domestic enterprises.

The Knowledge Capital Framework is based on three crucial assumptions about technology (Markusen, 2002):

1. *Fragmentation*: it constitutes that the location of knowledge-based assets may be fragmented from production because any incremental cost of supplying services of the asset to a single foreign plant is less than the cost to a single domestic plant.
2. *Skilled-labour intensity*: it reflects the knowledge-based assets as intensive in skilled-labour relative to final production. This and the above assumption on fragmentation give rise to vertical MNEs which base their choice of strategy on factor prices and market sizes as it was in Helpman (1984, 1985).
3. *Jointness*: it represents the feature of knowledge-based assets which can be joint input used in multiple production facilities. This assumption is based on the fact that the added cost of a second plant is less relative to the cost of setting a firm with a local plant. Jointness motivates production within multiple locations through firm-level scale economies, thus, horizontal integration appear in the model.

Markusen & Maskus (2001) stress that the fragmentation and the jointness are not equivalent properties. On the one hand, a knowledge-based asset may be easily transported to a foreign plant but it cannot be supplied to two plants simultaneously, for instance a skilled employee. On the other hand, the jointness assumes that an asset, such as blueprint may be used in multiple production locations at the same time without reducing the services provided in any single location. An enterprise may geographically fragment production at low cost without having firm-level scale economies that arise within third assumption.

The Knowledge Capital Model can not be solved analytically. Nevertheless numerical version of the model is solved over various parameter values. With a given level of trade costs, investment costs and lack of differences in relative endowments, the MNEs' production is highest when the countries are the same size. This production is undertaken by horizontal MNEs with plants in both countries. Horizontal FDIs are a result of the aim to place production close to customers and thereby avoid trade costs. However, when countries are similar in factor endowments and market size, the highest intra-industry FDI production is

expected. The highest value of affiliate output arises when a host country is both small and abundant in skilled labour. Under these conditions, most or all of the firms are vertically integrated. Headquarters, chosen on the bases of factor prices, are located in the small country. A single plant, on the other hand, is located in the large, skilled-labour-scarce country. The latter choice is based on factor prices and market size. Thus, vertical FDIs are motivated by the desire to carry out unskilled-labour intensive production activities in relatively unskilled-labour abundant locations. (Markusen, 2002; Markusen & Maskus, 2001)

The Knowledge Capital Model allow for both horizontal and vertical multinationals at the same time. Their appearance depends on size, size differences, relative endowment differences, trade costs and investment costs cross countries. Moreover, the framework permits one to observe MNE activity between similar countries in size or factor endowments. Nonetheless, this model does not cover all forms of MNEs in the economy. The distinction between vertical and horizontal FDI is clear once one considers two countries and two firm activities, namely headquarters and production. When one considers more countries and more stages of production process, some organisational forms do not fall into these categories. A multinational enterprise may be spread among three countries: headquarters in the home country, production in a foreign subsidiary which output is sold at a third country market. Ekholm et al. (2003) called this activity "export-platform FDI". They formalise this phenomenon by adopting a three-country model, where two of them are identical, large, high-cost countries and the third country is a small, low-cost country. MNEs, undertaking such activities, are derivative of vertically integrated firms.

Yeaple (2003), following the World Investment Report distinguishes another type of MNE, namely a "complex integration strategy". It refers to a firm that performs intermediate stages of production in one country to save on production costs (vertical integration) and then performs subsequent stages in several plants to save on transport costs (horizontal integration). In other words, the complex integration reflects the MNEs which combine horizontal and vertical integration within one organisational form. The author builds a three-country (East, West, South) model in which firms from one country may invest in two other countries. As in standard trade models, there are two sectors (X, Y) and two factors. Sector Y is characterised by perfect competition firms that produce a homogeneous product that is traded freely. The other sector (X) is composed of firms that produce differentiated products in monopolistic competition with non-zero trade costs. MNEs arise only in the second sector.

Yeaple (2003) notes that the complex integration strategy drives the dependence between the level of FDI in one country and the characteristics and policies of neighbours. In

this way, the determinants of FDI expand from a country-level to the level of neighbourhood which also depends of industrial characteristics such as transport costs, the factor intensities of production and the cost of investing abroad. These FDI determinants at country- and neighbourhood- level interact differently across industries and may result in complementarity or substitution of the two forms of FDI. The complementarity arises when a firm undertaking vertical (horizontal) FDI in a low-wage country and thus, it gets lower unit costs. This motivates a firm to produce a greater volume of output and shift other production activities into low-wage country. The model is expanded by Helpman et al. (2006).

1.2. The location theory on FDI

The location theory deals with who produces what products in which locations and what are the determinants of location choices. Many government policies attempt to shift economic activity in order to promote sustainable growth and eliminate disparities. However, the first step is to examine the motivation for the location decisions which provide an understanding of the impact of altering incentives.

Early location theories were developed in the 19th century in Germany. The most notable early theory was the optimal location of cities and farms affected by land costs and transport costs by von Thünen (1826). His model sought to explain the patterns of agricultural activities that develop around a market (city). Since von Thünen, more complex location models were proposed, mainly within geographical economics. (Fujita et al., 1996)

Many of the issues addressed in the location theory are significant to international economics, for instance agglomeration economies. The trade theory looks at patterns of international production and trade. Similarly, more and more recent seminal papers present insights into FDI and MNE location. The early analyses stated various reasons for spatial concentration. Marshall (1920) identifies three agglomeration effects that may make location more attractive (formalised in Krugman, 1991): (1) inter-firm knowledge spillover, (2) labour pooling, (3) diversity and scale of local specialized input supply. The author argued that these externalities appear only at regional- or industry- level.

First force is based on the diffusion of information within a set of firms. Enterprises learn from local producers, associates and competitors. This is based on what Fujita and Thisse (1996) noted that the use of a piece of information by a firm does not reduce its value for other firms. Clustered firms may take advantage of communication with other firms contrary to isolated producers. Second motive occurs when several firms set up in a single

location and, thus, offer a pooled market for workers with industry specific skills. The concentration of these firms lower the probability of unemployment but also the likelihood of labour shortage due to the existence of other enterprises. The workers can find employment that suits their skills and thus, they can expect higher wages. The firms may find easier employees that fulfil their requirements. Both workers and firms benefit. Third incentive is driven by the fact that localized industries can facilitate the development of specialized inputs and services that are based on the same logic as previous mechanism. All three mechanisms stresses that agglomeration economies develop mutually beneficial relations. (Krugman, 1991; Fujita & Thisse, 1996)

The great contribution to the location theory of multinational firms was given by the industrial organisation theorists, mainly by Dunning (1977). He proposed the first comprehensive framework that explains the scope and geography of the multinational firms' activity. The so called OLI framework (also called the eclectic paradigm) is a set of three conditions that are needed for firms to have a strong stimulus to undertake FDI: Ownership (O), Location (L) and Internalization (I). The possession of these forces by MNE gives it comparative advantage over local firms. This is particularly important because multinationals incur significant costs by doing business abroad in comparison with domestic firms. (Dunning, 2001)

The ownership advantage gives MNEs unique access to specific intangible assets such as technology, management, organizational skills, reputation, trademarks, brand names, patents, blueprints, exclusive or privileged market access to suppliers or customers. Ownership of such advantages allows all sub-firms of multinational company to enjoy some market power in the foreign market. It also may be a source of possibility of acting under lower costs in comparison with local firms. For example, one headquarters for few plants lower administration costs. Many of the ownership advantages are knowledge-based and, thus, easily transferable to other countries (Markusen, 2002). Moreover, previous experience driven by being multinational is also a main strength of MNE (Yeaple, 2003).

The location advantages encompass all features that motivate to locate production abroad rather than concentrate it in a home country. This is particularly the case when there are scale economies at the plant level. This set of advantages depends on a host country characteristics. Hence, it is not transferable but rather attributed to the host country contrary to the ownership advantages attributed to the specific firm. The location advantages have source in uneven distribution of raw materials and production factors in the world, proximity and size of the markets, communication and transport costs, trade barriers or differences of

political and legal systems (Cieślik, 2005a).

The last component of the OLI framework - the internalization advantages gives a firm tool to coordinate mobile ownership advantages with immobile location advantages. The internalization advantages encourage a firm to exploit its ownership advantage internally, rather than give any foreign company access to it by sell or license. Such transfers outside a firm would run the risk of dissipation of advantages over competitors. It may be incorporated with high costs of transactions such as costs of contract preparation, negotiations, cancellation or risk of misuse. Thus, FDI protect or augment firm's core competence. (Dunning, 2001)

All OLI variables rest on economic theory related to the location theory and also the assumption that firms choose the site of their activity at the most profitable location in space. Hence, many authors focused on OLI advantages, for example Ethier (1986), Ethier & Markusen (1996) who formalised the eclectic paradigm combining it into the knowledge-capital model. However, OLI framework is not a predictive theory of the MNEs but only framework for analyses of determinants of international production. (Dunning, 2001) Although Dunning shed useful light on the MNE location, there was still problems with incorporating a location choice of MNE into the theory which raise from separation of the trade theory and geographical economics.

Economists' interest in the location of international activity appeared and disappeared over the last two centuries. As mentioned by Fujita et al. (2000), since 1990 previously neglected special economies were reborn into theoretical and empirical studies. The new stream of the literature is widely known as “new economic geography” that relies on new theoretical tools of the new trade theory such as product differentiation, imperfect competition and increasing returns to scale. Moreover, it incorporates trade costs strongly emphasized by the location theory. The primary concept of the new economic geography is that product and/or inputs differentiation may cause agglomeration forces. This is conjoined to the trade off between increasing returns and transport costs highlighted in central place theory, in order to generate circular and cumulative causation, that results in the formation of cities and/or industrial districts. (Fujita & Thisse, 1996)

The backbone for this strand to date is the so called “core-periphery model” of Krugman (1991). He initiated studies on linkage between the location theory and economies of scale. Krugman (1991) considers the two-region model with two sectors (agriculture, manufacturing) and two factors (two types of labour: immobile peasants, mobile workers). Agriculture (“periphery”) produces homogeneous agricultural product under constant returns using first type of labour and sold on the competitive national market (zero-transport costs).

Manufacturing ("core"), on the other hand, provides an increasing returns, differentiated products sector that can be located in either region. Manufacturing products use second type of labour and are sold on monopolistically competitive regional markets, where transport costs are positive.

The core framework of geographical economies models the trade off between dispersal and agglomeration, or centrifugal and centripetal forces. The immobility of the peasants is a dispersal force of production activity because they consume both types of products, whereas, the agglomeration effects are generated through circular causation. If a larger number of manufacturers is located in a region, the number of regional products is greater. Then, the price of differentiated products is lower in comparison to the other region. This creates a real income effect for workers, which induces other workers (=consumers) to migrate into this region, creating larger demand. Hence, the demand for manufacturing product grows and encourages even more firms to locate in this region and differentiated even more production.

In this way, a circular causation for the agglomeration of firms and workers arises and scale economies at the individual firm-level are transformed into increasing returns at the region-level. Therefore, the production of manufacturing product concentrates into one region. Fujita et al. (2000) identify two agglomeration effects: the cost-of-living effect and the market-access effect. The first says that the demand depends on the location of the firms. Workers (=consumers) want to settle near manufacturing centre, that assures cheaper products due to lower share of import. The market-access effect appears because a firm locates its activity close to larger demand in order to avoid transport costs. Industrial concentration, then, tend both to follow and to create market access (Krugman, 1992). However, there is also a third effect, so called the market-crowding effect which disperses firms. Firms in large markets, that face intensive competition, are motivated to choice location in region with lower competition. The final result of these mechanisms is influenced by transport costs and gives rise to agglomeration or dispersion.

Krugman (1991), generally, underlines the importance of transport costs, economies of scale and the share of manufacturing in national income. Worth noting is the non-monetary relationship between the degree of spatial concentration and level of transport costs. Very high or very low trade costs favour the dispersion of economic activity, while between these values the agglomeration emerge, once the spatial mobility of workers is low. As previous analysis emphasized, the agglomeration force is a cumulative and self-reinforcing process so historical aspects (initial situation) matters for location of MNE. From this it follows that the emergence of agglomeration at a particular site does not depend upon the intrinsic feature of this location.

Fujita and Krugman (1995) relax assumptions on factor mobility (mobility of labour in agriculture). The authors found that if varieties of products are close substitutes and/or the population is sufficiently large, then an individual producer has a motivation to set up far away from the city ("core") and to sell a larger output to local consumers. That give rise a possibility of more than one city contrary to conclusions from the original version of the core-periphery model.

Krugman's model is analytically insolvable but provides a significant insight on the optimal location choice of firms. One of the implications of the core-periphery model was developed by Head & Ries (1996). They provide formal model of location of self-reinforcing under monopolistic competition FDI. Krugman's (1991) workers are understood as foreign investors. Foreign firms have production that use two primary inputs (labour, energy) and one intermediate input. Productivity and profits of a MNE increase with rise of varieties of the intermediate input used. It resembles the "love of variety" effect of a Krugman's worker. The profit of MNE is influenced by the price of these intermediate inputs. Therefore, the profit maximization of the multinationals determines the demand of a single supplier. Further, the supplier profit is caused by the number of the MNEs, the number of suppliers and prices of in prices of inputs and products. The model, then, predicts that the appearance of MNE in a host market stimulate entry by local specialized suppliers. Growth of intermediate inputs sector makes a host market more attractive to subsequent foreign investors and presents a self-reinforcing phenomenon.

As the previous review shows the models in the new economic geography theory mostly deal with the case of two locations, two industries and two factors. This simplified models make troublesome to obtain analytical results. Hence, there were some attempts to present the problem of choice location of MNEs into higher order dimension (Forslid et al., 2002).

1.3. Empirical studies on FDI location and MNEs

In response to the new economic geography (Krugman, 1991) empirical studies investigate the accuracy of theoretical determinates of the location choices. As Marschall (1920) stressed these motives matters at the lowest aggregation level such as industry or a firm. Earlier studies often were exploring theoretical hypotheses on country level data. Only most recent studies have matched the firm level location theory with an appropriate level of data, this is firm- or plant- level data (Head & Mayer, 2004). The particular interest captures developed countries, mainly the United States. Coughlin et al. (1991) and Head et al. (1995,

1999) find agglomeration effects important, exploring the determinants of the location choice by MNEs within the US. Already, Henderson (1986) had evidenced, that this importance can be implied by factor productivity that arise form industry concentration.

Other empirical analyses[3] have done the same for large countries or unions (the EU, OECD nations) with respect to foreign investors as a whole or foreign investors coming from a specific country. Little research is conducted on FDI within Europe, especially CEE transition countries (Dispier & Mayer, 2004; Bekes, 2005). Head & Mayer (2004) examined Japanese firms within nine Western European countries. The location of FDI at sub-national level is a seriously understudied research area. However, the development of cities and regions in a particular country depends on the processes of MNEs' localization and agglomeration within a country. This is a result of globalization and internationalisation of the world economy and it can not be neglected. Moreover, a firm faces multi- stage decision process, undertaking international activity. The choice of becoming multinational is followed by choosing the exact location. The selection is assumed to be made under profit maximization (cost minimization or revenue maximization). A firm determines a country and, then, exact site in one of the regions of this country. The first choice is based on country-level characteristics, but the following choice is made with respect to region-level characteristics. Thus, determining the geographical pattern of FDI, one should take into account the geography of the host country, concerning regional characteristics. The sectoral composition of the FDI also affects location choices.

Large regions are inappropriate for analyses of agglomeration effects because they are not adequate in accounting for labour market conditions and other factors that may be significant only locally. Any attempt to estimate the effects of spatial concentration nationally may lead to biased results. Among academic papers focused on a local level, one may looked at location of FDI within Italian provinces in Mariotti and Piscitello (1995) and Portuguese regions in Guimarães et al. (2000). The latter found that agglomeration economies are decisive in the choice of location and confirmed previous theoretical deliberations. However, the most comprehensive at local level studies is provided by Crozet et al. (2004) for 90 territorial units in France and by Cieślik (2005a) for Polish 49 voivodeships.

As Dunning (2003) concludes that most empirical literature on the location determinants of FDI could be classified into three groups: (1) the motivation for the FDI; (2) the economic and business environment of host or potential host countries; (3) the mode

3 For the division of recent research (since the 1980s) on location of FDI broken down by covered geographical regions see Boudier-Bensebaa (2005). There are the main results of listed papers.

of entry of the FDI.

The first set of determinants of the FDI includes motivations, driven by access to special resources, market, strategic assets or efficiency (through common governance of geographically dispersed activities). This class of determinants is related with firm's characteristics. One may also determine here the first of OLI variables: Ownership, discussed in the previous section. There were numerous attempts to measure these advantages that inward foreign investors have over domestic firms. For example, Griffith and Simpson (2001) demonstrates using a UK sample that any productivity gap between MNEs and local firms depends on the size of a firm and the quality of the capital stock (assets that give ownership advantage). Moreover, Helpman et al. (2004) found the evidence on US export and affiliate sales data (52 manufacturing sectors and 38 countries) that only the most productive firms within sectors set foreign plants.

The second group of locational incentives combines the economic and business environment of host or potential host countries interrelated with the FDI related policies pursued by their governments. These country-specific characteristics give rise to interest in the location advantages. The location site becomes crucial, as the focus turns to factor endowments in terms of infrastructure, labour and existing level of capital and technology, but also market access and some agglomeration effects. Head and Mayer (2004) focus on market access (also called Market Potential)[4] and observe a positive correlation between entry of Japanese firms into the EU. Their results are even more interesting because they use the measure of market potential, that aggregate demand from multiple EU regions, adjusted by distance.[5] Crozet et al. (2004) and Spies (2009), however, notice that differences in market potential may be more important over time than across countries. The contrary is true for wages as found Crozet et al. (2004). Further, Coughlin et al. (1991), observing the location decision of foreign firms in the US, confirm the significant influence of per capita income (proxy for market size), wages (proxy for labour costs) and density of manufacturing activity (proxy for agglomerations effect and competition).

As Mayer et al. (2007) affirms, many empirical location choice papers have repeatedly shown the strength of the cumulation force, namely the desire of investors to follow other foreign investors in the same industry. An example is the article by Crozet et al. (2004) that confirms the positive influence of a firm's location choice on the probability, that the

4 *Market potential* combines the local sales potential, but also the access to other markets and, therefore, it affect location choice (Spies, 2009).

5 For detailed analyses of market access also see Amti and Javorcik (2008) and Spies (2009). The two latter consider two types of market potential: internal and external market potential.

subsequent firms make the same choice. Ottaviano et al. (2003) explains that this agglomeration tendency arise, because the new firms have a high propensity to settle at places where economic activity are already established. This confirms the possibility of running a business at this particular site. Moreover, as Mariotti and Piscitello (1995) and Guimarães et al. (2000) observed, the industry clusters of foreign firms facilitates information (knowledge) spillover on the local environment. This process occurs either through business relationship or because it demonstrates the location's potential. The entry costs may, then, go down. The authors also emphasize that it may be important for MNEs but not necessarily for local enterprises.

Another aspect of structure of the economic and business environment in the host country is access to supply of inputs. If it is high, it reduces the price index of intermediate inputs. It makes the host country more attractive because production costs decrease.[6] Amiti and Javorcik (2008) are among the first that incorporated the supply access variable, taking into account the actual matrix of inter-industry linkages in empirical location choice analysis.

Among the literature on location choice of FDI is also considered quality of public authorities' activities, that Bloningen (2005) enclose it under the term “Institutions”. This term encompasses government policies (taxes, subsidies and exemptions), efficiency of public institutions (corruption, bureaucracy)[7], governmental expenditures[8] and infrastructure. As Boudier-Bensebaa (2005) pointed out, Institution as a country-level characteristic is difficult to ascertain. There are no accurate measurements of institutions activities due to its nature. Comparability across countries is questionable. Moreover, they provide little informative variation over time within a country because they do not change often. Wei (2000) observes strong negative correlation with FDI. However, there are other studies that find, taxes and incentives have limited impact on interregional location (Head et al. 1999). The widely studied component of public activities is infrastructure which higher regional productivity and, therefore, firms' profits. It encourages MNEs. Infrastructure refers to transportation facilities such as roads, railways, ports, airports as well as telecommunication and power supplies.

The third type of locational determinants refers to the mode of entry or expansion of the FDI, for instance Greenfield FDI or mergers and acquisitions (M&As). Already, Friedman et al. (1992) have argued that FDI-decisions differ with respect to their form. M&As mainly are derivative of FDI undertaken in order to get access to bigger market.

6 Krugman and Venables (1995) provide an early theoretical model that shows these interactions.
7 See Globerman and Shapiro (2002).
8 See La Porta et al. (1999).

Studies typically compare alternative modes of international activity such us export/import and foreign subsidiary (FDI). Yeaple (2003) detected that sales of foreign subsidiary is the more important relative to international trade, the higher are trade costs (tariffs, transport costs). Kuch et al. (2007), studying five Asian countries (Indonesia, Malaysia, Philippines, Singapore and Thailand) between 1971-2005, have identified two interesting trade-FDI linkages differentiated according to time horizon. First, FDI and import are complementary in the long run, while substitutes in the short run. Second, FDI and exports, however, are substitutes in the long run and complements only in the short run. The short run complementarity may be explained by a prudent strategy of the MNE. It starts as an exporter, learns about potential host market's economic environment, and finally it undertakes FDI to exploit it previous experience. The positive linkage of FDI location choice and prior export flows was examined already by Tadesse and Ryan (2004). This study underlines, therefore, that international trade influence FDI.

Recent economic literature also pays greater attention to the border effects that are explained, for instance by tariffs, transport costs and regulatory differences or information cost differences but also by language differences (Head & Mayer, 2004). Anderson and van Wincoop (2003) found evidence that border effects are higher in case of relatively smaller economies, while larger economies have lower effects. That sounds reasonably while larger economies attract also through market size, access to high technological solutions and so on. The issue of border effects become more and more interesting while one considers country that shares boundaries with the EU members. For example, Cieślik (2005b) analyses attraction of Polish frontier regions for FDI in case of border upon the EU members and non-EU members. The paper shows regions, that border with three EU non-accessing countries (Belarus, Russia and Ukraine), are less attractive to MNEs. This is crucial insight to the location theory on FDI.

1.4. Previous empirical studies on FDI and MNEs in Austria

The empirical literature concerning Austria rarely undertakes analyses on spatial location of FDI. The aspect of FDI location choice within Austrian provinces is neglected, in particular, it is true for location of MNEs within Austrian borders. Tolentino (1993) mentions that Austria has been described as a major outward investor in the literature. Next chapter shows that this is not longer true. Most of available studies examine regional patterns of outward Austrian FDI, especially in Central and Eastern European Countries (CEECs). For

example, Altzinger (1998), examining Austrian outward FDI, finds that investments are concentrated in adjacent countries. Altzinger and Bellak (1999) detect very interesting characteristic of these investment flows, namely significant part of outward FDI is undertaken by firms, that themselves are affiliates of foreign MNEs. (Indirect FDI). This indicates that MNEs invest in Austria in order to reach East Europe. Inward investment is in the same time outward investment. Thus, Austria is further FDI-platform. Pfaffermayr (1994, 1996) corroborates that Austria seems to be a middleman between the more economically stable West and developing East.

Wolfmayr-Schnitzer and Stankovsky (1996) deal with the question to what extent Austria has been able to seize the opportunity to become a central location for MNE wishing to do business in Eastern-Europe. The survey of 115 foreign[9] – controlled enterprises in Austria provides mixed results. It determines that Austria is positioned as a gateway to the East, but the Austria's location advantage may diminish as the reform countries of the East adopt to the Western economic system. The advantage of geographical proximity constitutes the knowledge of institutions and market opportunities in the East as well as a higher stage of development (transportation infrastructure, telecommunications, quality of life for expatriate staff of MNEs, or the skill of its labour force). However, this advantage occurs only with respect to Austrian´s immediate neighbouring countries, i.e. the Czech Republic, Slovak Republic, Hungary and Slovenia. Austria has only a limited role as a centre for Russia, the rest of the CIS[10] and the Baltic. Wolfmayr-Schnitzer and Stankovsky (1996) observe that the agglomeration centres arise from access to the Eastern market, skill of the workforce, access to information, advanced infrastructure as well as social and political stability.

Bellak (1997) points out that Austria never had large MNEs and even in 1997 only a few firms were internationally significant. Gratz-Moster (1989) found that only few companies considered Austria to be an important location for operations with more than one production unit. Subsidiaries in Austria usually have little strategic function for the company. Leibfritz and Janger (2007) remark that, in case of Austria, both inward FDI flows and stocks have been increasing recently. Nevertheless in-FDI continues to be below the EU average and also below countries of similar size and level of development such as Finland, Sweden or Denmark. Until the early 1990s, Austria was at the border of the “Iron Curtain”. The authors identify it as a factor of lower interest in location for Western countries' investors. However, after the opening of low-wage CEECs, Austria attracted more Western FDI, the authors report.

9 Out of which 74 firms are qualified as regional headquarters for the East.

10 Commonwealth of Independent States, an alliance of states that had been Soviet Socialist Republic in the Soviet Union prior to its dissolution in December 1991.

Altzinger et al. (2002) and Bellak (1998) argue that Austria, situated on the periphery of the Western world, is an important EU host country for transition countries. Altzinger et al. (2002) remark that the activity of the CEECs affiliates in Austria differ significantly from this set up in other transition countries. Inward FDI from CEECs are generally of a market servicing nature. Most of their affiliates are trading firms and only very few are manufacturing firms. These foreign firms are mainly small or medium-sized firms. More than 80% of the affiliates have less than 20 employees. Regional distribution of the CEEC firms in Austria reflects geographical proximity and border effects. While the subsidiaries from CEEs amount for 1,8% per province, thus, 10,4% in Carinthia (in proximity to Slovenia) and 10,2% for Burgenland (in proximity to Hungary) may be considered as regional clustering. Altzinger et al. (2002) also detect essential differences of types of activities between CEECs' FDI and FDI originating in the EU. In contrast to the EU's FDI, the CEECs' FDIs are, characterized by high capital-intensity, low labour-intensity and large sales per employee.

CHAPTER II. FDI IN AUSTRIA

2.1. General information on FDI in Austria

FDI flows in Austria have started to matter since late 80's and early 90's. One of the reasons was the transformation of CEECs after 1989 when the “Iron Curtain” was torn down. Moreover, Austria officially applied for membership in that time. In 1995, Austria becomes the member of the EU. Till the enlargement of the EU in 2004, the Austria boarders were in the same time the EU borders. After accession of some CEECs Austria has become middle land in the EU and faces growing competition from these countries as a potential FDI location. The competition rises especially in sectors that treat wage costs as a decisive factor.

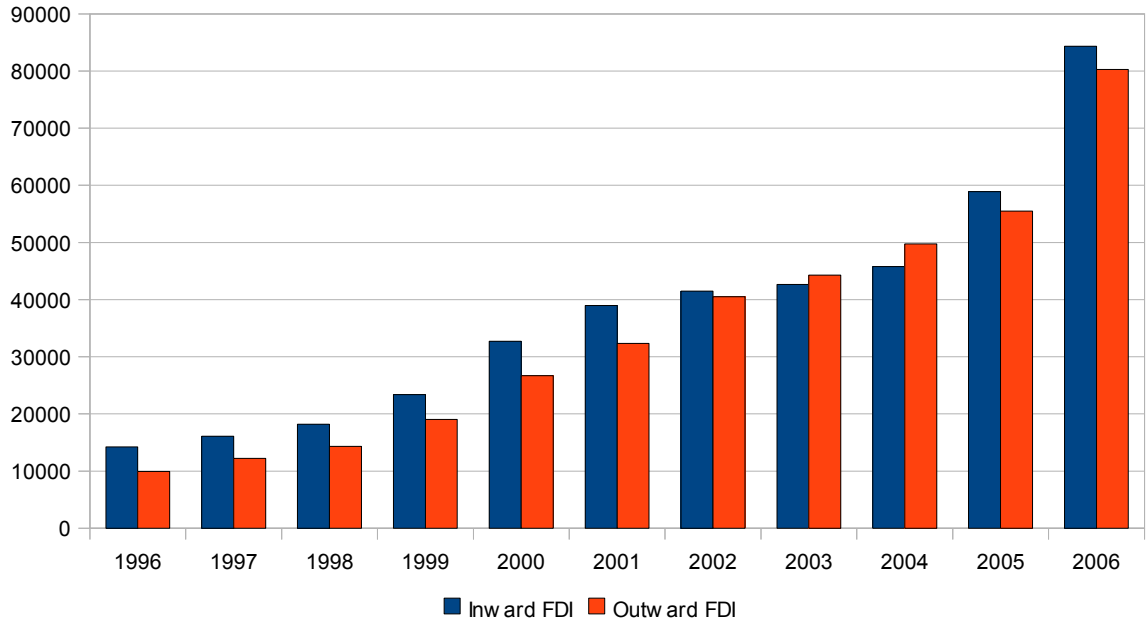
The Austrian government offers some advantages to strengthen Austria's attractiveness as a location for investment. Foreign firms and domestic firms are treated equally. Both can take part in privatisations of public companies, both may apply for support from government. Since 2002, there were introduced special tax incentives for industrial research in order to stimulate the research-based investment. The corporate tax rate was significantly reduced from 34% to 25% in 2005. There is no wealth tax, net worth tax or trade tax in Austria while neighbouring Germany has these taxes. Moreover, GDP per capita is the ninth highest in the OECD and the fourth highest in Europe. Austria experiences political and economic stability. The unemployment rate, although, has increased from 4% in 1996 to 4,8% in 2006 but still is very low. (PRS, 2006)

Austria shows a negative FDI balance, which means that inward FDI are bigger than outward FDI. However, figure 1. shows that in 2003 and 2004 the opposite relation arises and sets Austria on positive FDI balance of 1600 MLN Euro and 4600 MLN Euro respectively. Nevertheless, both inward and outward FDI climbed over the period 1996-2006. In 2006, FDI faced a significant exceptional increase by 40% in each type of investment. Such high change was only experienced in 2000.

The main source of FDI into Austria are European countries. Their investment amounts for around 80% each year. As table 1. presents most of European interest comes form the old 15 EU countries. The table contain also information on FDI with respect to CIS countries. Although the value of FDI to or from these countries is not impressive, as the early 90's empirical literature notice, Austria is often the key investor in these countries due to proximity and historically matured cultural understanding of Austrians for the CEE region. Austria is main investor in Bosnia-Hercegovina (39,5% share of total FDI), Slovenia (32,3% share),

Bulgaria (25,4% share) and Romania (34,5% share) as is reported in ABA (2008).

Figure 1. Austrian Outward and Inward FDI in Mln Euro over the period 1996-2006



Source: Own elaboration based on OeNB (1999, 2000, 2001, 2002, 2003, 2004).

Table 1. Inward and outward FDI in Austria in Europe, the EU-15 and CIS over 1996-2006

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Inward FDI											
Europe	11875	14045	15613	20171	29088	34055	33804	35133	37247	46610	69840
EU15	9644	11498	..	16673	25389	28494	30240	30803	32647	40923	60908
CIS	..	..	..	-29,3	240	385,9	442	574	686,4	473,1	598
Total	14237	16075	18197	23364	32704	38952	41488	42632	45765	58874	84337
Outward FDI											
Europe	8450	10134	11993	15432	21624	26181	32632	36431	41605	49542	72669
EU15	4551	5094	..	8463	11257	12360	15124	15278	16308	18761	27947
CIS	..	..	..	114,8	250	920,4	1213	1575	1517	1422,4	4557
Total	9911	12220	14333	19039	26674	32351	40512	44308	49765	55476	80256

"." - missing data
Source: Own elaboration based on OECD database.

The key investor in Austria is Germany which is the biggest neighbour that shares the same language. In 1996 more than 40% of total FDI origin from Germany (table 2.). Although the absolute amount of German FDIs have increased four times over the period 1996-2006, the share of total FDI in Austria decreased to 28%. Nevertheless, Germany keeps the

invincible position among other investors. Other important European investors come form Netherlands, Switzerland and the UK. However, they do not control more than 10% of FDI. Among non-European countries the leader investor is the US with the average share that is less than 10%. The position of the countries listed in table 2. does not change dramatically with exception of Germany. However, their FDI grows essentially, namely five or seven times in comparison to 1996. The sharp and exceptional jump to 23% share was made by Italian investors in 2006, while it controlled only 1-3% over the period 1996-2005 (OeNB, 2008).

Table 2. The absolute value of investment and share of total Austrian FDI of chosen countries

		1996	1998	2000	2002	2004	2006
GE	Mln Euro	6190	7320	15295	16344	17306	24213
	Share %	43	40	47	39	38	29
NE	Mln Euro	1211	1396	2053	2928	3335	6173
	Share %	9	8	6	7	7	7
CHE	Mln Euro	1632	1719	2306	2356	3058	5632
	Share %	11	9	7	6	7	7
UK	Mln Euro	581	670	1881	4623	5062	4455
	Share %	4	4	6	11	11	5
US	Mln Euro	1019	1525	2024	4695	5179	4697
	Share %	7	8	6	11	11	6

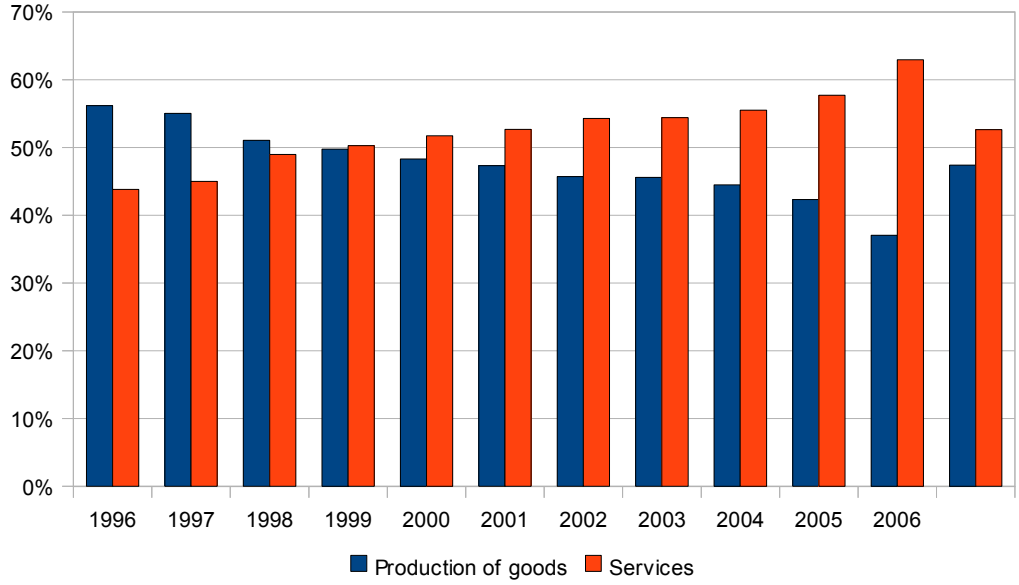
GE – Germany, NE- Netherlands, CHE – Switzerland, UK – the United Kingdom, US- the United States.
Source: Own elaboration based on OECD database.

Austria represents a small open economy with services that accounts for the majority of economic activities. About 20% of employment and 30% of turnover originate from foreign firms that invested in Austria, both in the manufacturing and in the services. However, the multinational firms' investment in the service sector clearly prevail over investment in manufacturing sector what reflect sector structure in Austria (Figure 2.). One of the indicators, that display it, is employment of direct investment enterprises by sectors.

Figure 2. depicts the issue of increasing interest in investment in services activities. Over the period 1996-2006, the industry and service employment payroll took opposite direction and widen the difference between them. FDI companies increased capital spent on employment in services from 44% at the beginning of the analysed period to 63% at the end of the period. Thus, MNE acting in the production of goods have paid 83 335 Mln Euro in 2006. The conclusions are similar when the FDI flows are considered. The service sector

absorbed 73,2% of all FDI stocks in 1999 while the other 26,1% of FDI was accounted to manufacturing sector that includes the manufacture of machinery, chemicals, metals and electrical and optical equipment.

Figure 2. Employment of direct investment enterprises by sectors



Source: Own elaboration based on OeNB (downloaded on 10.05.2009), http://www.oenb.at/en/stat_melders/datenangebot/aussenwirtschaft/direktinvestitionen/direktinvestitionen.jsp

The most important sectors with respect to foreign companies are trade and repair, electric and optical equipment, machinery and equipment and chemical rubber and plastic products sectors (table 4.). The trade and repair sector takes a leading position during the period and keeps growing and accounts for 44,4% (BMWA, 2002). However, the other activities faced decrease in employment payroll. Moreover, the real estate renting, IT and R&D experienced growth that results with six times bigger amount in 2006 than the previous value of employment payroll in this sector in 1996. In 1999, it was the second most important category (17,5%) according to report of BMWA (2002). Pender (2002) present that the greatest contribution to the most recent wave of new entries stems from personal and social services, as well as to software-intensive services. Table 3. presents the founders of R&D. One of the group is abroad that finances about 20% of Austrian R&D. That may be one factor that maintained the increase in this sector. In 2006, the significant share of inward FDI was directed to the real estate sector (42,7%) and the financial sector (24,7%). trade and repair sector faced 14,3% of total inward direct investment of MNEs.

Table 3. Research and development by founder

Year	Bund	Province	Firms	Abroad	Others	Total	R&D rate*
1998	1,1	0,14	1,42	0,68	0,06	3,4	1,78
1999	1,2	0,21	1,55	0,74	0,07	3,76	1,9
2000	1,23	0,25	1,68	0,8	0,07	4,03	1,94
2001	1,35	0,28	1,83	0,86	0,06	4,39	2,07
2002	1,36	0,17	2,09	1	0,06	4,68	2,14
2003	1,39	0,29	2,27	1,01	0,07	5,04	2,26
2004	1,46	0,21	2,48	1,02	0,09	5,25	2,26
2005	1,76	0,33	2,75	1,09	0,1	6,03	2,47
2006	1,77	0,22	3,06	1,16	0,11	6,32	2,46

Source: Own elaboration based on WKO (downloaded on 01.05.2009), http://wko.at/statistik/jahrbuch/forschung.pdf

Table 4. Employment in MNE by sectors weighted by share in nominal capital

Foreign investor activity	1996	1998	2000	2002	2004	2006
Agriculture Forestry Fishing	115	130	125	109	16	24
Electricity gas and water supply	161	149	5	14	203	240
Public and other services	277	737	1 336	1 753	1 789	1 755
Mining and quarrying	894	581	630	637	608	582
Wood and wood products	1 615	1 867	1 819	1 785	1 934	1 945
Other manufacturing; recycling	2 478	1 925	1 781	1 159	634	639
Non-metallic mineral products	3 664	3 433	3 560	3 872	3 979	4 266
Construction	4 936	3 866	4 108	4 254	4 331	2 728
Hotels and restaurants	4 941	5 580	6 089	6 145	7 123	6 127
Transport storage and communication	5 602	11 207	13 176	11 329	10 002	7 339
Paper and paper products; printing	5 619	4 337	4 771	5 793	6 016	5 571
Food beverages and tobacco	6 428	8 914	9 245	6 484	3 082	4 650
Metal and metal products	8 101	9 165	13 765	10 823	9 697	9 125
Textiles clothing and leather	8 229	7 577	7 628	9 052	5 090	4 648
Real estate renting IT R&D	8 572	14 998	17 105	22 088	22 391	34 935
Banking Insurance	11 574	12 279	20 816	21 136	15 873	15 923
Motor vehicles and other transport equipment	11 757	10 968	11 082	10 806	10 286	9 701
Chemicals rubber and plastic products	17 856	18 352	17 842	15 395	15 834	12 907
Machinery and equipment	19 156	17 177	17 533	16 471	18 307	18 227
Electrical electronic and optical equipment	28 241	29 067	27 974	26 144	23 539	12 700

Foreign investor activity	1996	1998	2000	2002	2004	2006
Trade and repair	62 026	67 921	71 963	71 489	72 067	83 335
Total	**212 241**	**230 230**	**252 353**	**246 738**	**232 802**	**237 368**
Production of goods	119 249	117 508	121 868	112 799	103 556	87 954
Services	92 992	112 722	130 485	133 939	129 245	149 414

Source: Own elaboration based on OeNB (downloaded on 10.05.2009), http://www.oenb.at/isaweb/report.do?lang=EN&report=950.6

The MNEs that invest in Austria undertake long term activity. Around 70% of existing foreign firms do business more than 5 years (table 5.). Other 20% exist for 2-5 years. This indicates that Austria keeps being attractive location for foreign investors over the time. The decision of MNE to start up the international activity in Austria was based on long term incentives. The number of investors still grows and the number of more than 5 year old foreign enterprises rises as well. Although the main part of investors are old firms, they are rather not big entities. 50% of investors employ only up to 19 employees. However, the low number of employees may reflect the nature of controlled activity. It was already said that the great portion of investors develop their business in service sector. This sector is not so labour incentive but rather knowledge- and technology- incentive. The next large groups that include 16% of investments each are MNE that employs 19-50 workers and 100-499.

Table 5. Age, staff size and motivation of investment among MNE in Austria

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Age of enterprises											
new	244	238	215	211	225	217	165	160	424	189	591
2 to 5 years	415	470	525	544	513	493	495	492	807	437	350
more than 5 years	1703	1756	1785	1787	1850	1897	1973	2027	1496	2095	2142
Staff size											
up to 19	1210	1285	1332	1335	1319	1310	1317	1382	1249	1460	1500
20-49	381	393	401	405	448	472	491	489	446	489	505
50-99	277	287	290	308	292	300	307	306	352	309	397
100-499	396	404	396	390	415	413	404	394	522	358	648
500-999	54	52	57	59	67	69	72	69	89	69	119
1000 and over	44	43	49	45	47	43	42	39	69	36	104
total	2362	2464	2525	2542	2588	2607	2633	2679	2727	2721	3273

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Reason % of no of investments											
Labour cost	1,5	1,5	1,3	1,5	1,1	0,8	0,9	0,8	0,7	0,5	..
Taxation	2,6	2,5	2,4	2,2	2,1	1,7	2,2	2,5	2,4	2,8	..
Market access*	66,3	66,3	65,8	64,8	64,6	65,6	65,7	64,4	62,5	60,4	..
Supply access**	2,3	2,2	2,2	2,1	2	1,8	1,7	2	2	2	..
other	27,3	27,5	28,3	29,4	30,2	30,1	29,5	30,3	32,4	34,3	..

*to secure sale
**investment in order to secure the supply sources (raw materials)
Source: OeNB (1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008).

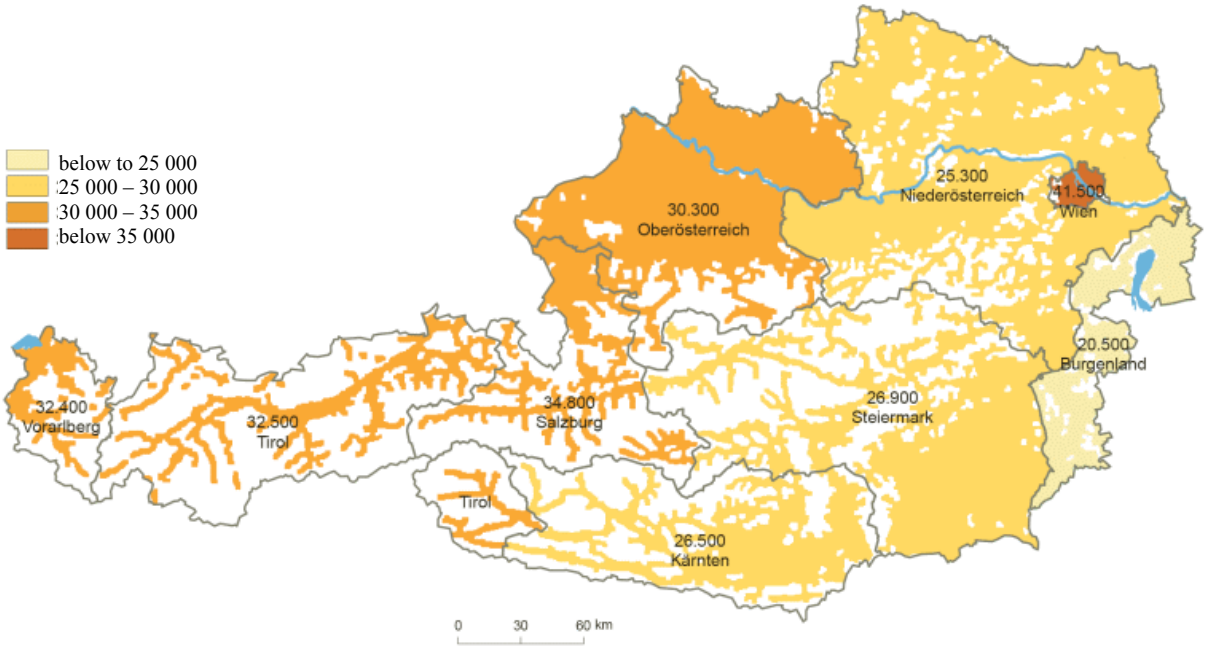
OeNB in its annual survey ask around 4000 foreign enterprises for main motive of choosing Austria. The 60% of respondents pointed market access as a main reason of their location in Austria. This fraction stays almost unchanged during the discussed period of 10 years. The labour cost, taxation and supply access are not considered as important determinants of FDI in Austria. Their amount does not exceed 2-3%.

2.2 FDI and regional characteristics of Austria

Austria is relatively homogeneous country. The proof on it can be the fact that income distribution is one of the most equal in the OECD (figure 3.). Moreover, inter-regional differences in employment rates are small. The employment rate is amounted for 69% while the “Lisbon target” is of 70% for the EU. (OECD, 2007).

Austria is divided into 9 provinces that differ in size. The biggest province is Lower Austria that surrounds Vienna. The next big area is named Tyrol. According to size also Upper Austria and Salzburg matter. Extremely small in comparison to these regions is Vienna, the capital city. Vienna in many aspects outperforms other regions. If it be included in one of other regions, it would distort the economic indicators of this region. It is already seen on figure 3. and will be shown in following part of this section. The highest GDP per capita obtain Vienna and Upper Austria.

Figure 3. Gross Regional Product per capita in 2006



Source: Statistik Austria (2009).

Table 6. Austrian counties and their area

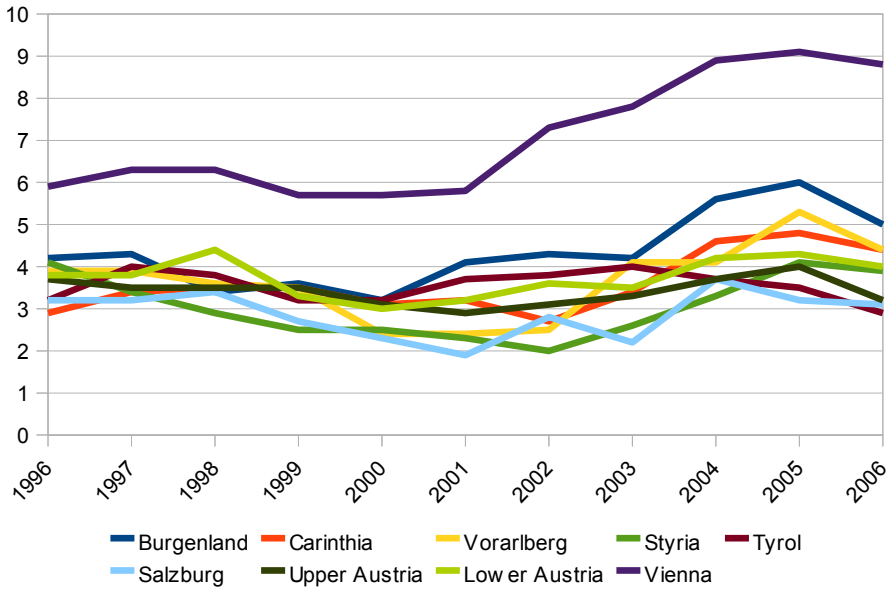
English name	Original name	Area	Share of population	Share of area
Burgenland	Burgenland	3965	3,38%	4,73%
Carinthia	Kärnten	9536	6,77%	11,37%
Lower Austria	Niederösterreich	19178	19,14%	22,87%
Salzburg	Salzburg	11982	6,39%	8,53%
Styria	Steiermark	7154	14,52%	19,54%
Tyrol	Tirol	16392	8,43%	15,08%
Upper Austria	Oberösterreich	12648	16,95%	14,29%
Vienna	Wien	2601	20,01%	0,49%
Vorarlberg	Vorarlberg	415	4,40%	3,10%

Source: Own elaboration based on SuperSTAR database, Statistik Austria.

The employment rate is generally constant over time and over provinces although they are differentiated by the number of the population. The maximum difference is 1-2%. Thus, it can be assumed that it does not differentiate the location of FDI within Austria. Vienna is characterised by the exceptionally high unemployment rate in comparison to other counties. Over the analysed period it has changed form 6% to 9% while other counties share similar trend and level of unemployment rate around 4%. The high unemployment rate in Vienna may

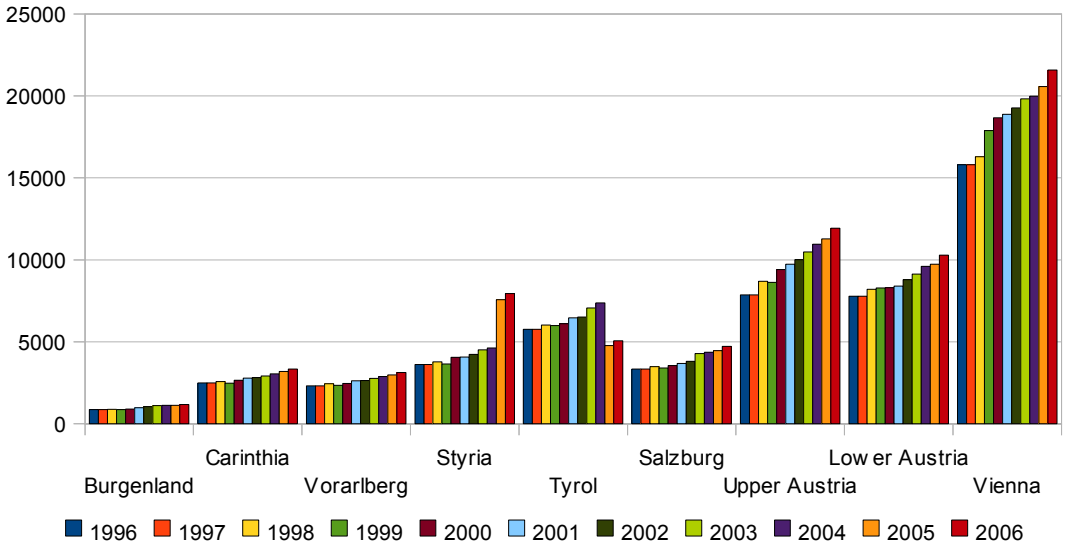
be a result of extremely high population density. The 20% of total population of Austria lives in Vienna that accounts only for 0,49% of total country area. In Vienna wages are at least twice as much as in other regions. High wages also appears in Lower Austria and Upper Austria. Nevertheless, in all provinces the wages increase over the period 1996-2006 (figure 5.).

Figure 4. Unemployment rate by provinces



Source: Own elaboration based on SuperSTAR database, Statistik Austria.

Figure 5. Gross annual wage in Mln Euro among provinces over 1996-2006



Source: Own elaborations based on SuperSTAR database, Statistik Austria.

Vienna outweighs other counties in the level of education. (table 7.) The level of tertiary education is higher on average by 10% than in other provinces and the secondary education level employees are smaller group. Generally, 60% of Austrian has secondary education and only around 15% have tertiary education level. This works in favour of the development of the high and medium technology industries that constitutes 40-47% of manufacturing in Vienna. Similarly, the half of services located in Vienna are the knowledge intensive services. However these two sectors differ in importance what can be noted from employment of these sectors. The former does not require availability of huge labour force but the knowledge intensive services employ around 40% of employment in the given region services sector. This indicates that human capital and its quality should be important factor distinguishing the provinces, although the analyses of both sectors should be done separately.

Table 7. Education level among counties and skilled labour incentive services in 2006

	Elementary education % of labour	**Secondary education % of labour**	**Tertiary education % of labour**	**H&MTech * as a % of industry**	**H&MTech as a % of labour**	**KIS** as a % of services**	**KIS as a % of labour**
Burgenland	13,4	69,9	16,7	37,1	7,1	42,2	26,8
Carinthia	19,1	65,3	15,6	33,5	5,9	42	26,9
Lower Austria	22	63,1	14,9	30,4	5,3	41,1	27,6
Salzburg	21,4	62,9	15,6	37,7	9,3	44,2	26,4
Styria	16,8	66,6	16,6	39,1	8,3	45	27,4
Tyrol	23,8	60,1	16,1	28,8	8,1	42,9	25,6
Upper Austria	17,2	67,1	15,7	35,7	6,6	44,9	29,4
Vienna	18,4	56,9	24,7	47	5,6	53,6	42,4
Vorarlberg	17,4	64,9	17,8	28,9	4,7	40,9	28,3

*High and Medium Technology Manufacturing
**Kapital intensive services
Source: OECD, Regional Database.

As it was shown in previous section the general characteristic of Austria is high share of services in total economic activity. This feature is shared by all regions (table 8.). 50% of gross value added is generated by services in all provinces. The agriculture is a minor sector among provinces. The highest participation in creation of country gross value added has Vienna. It outweighs all other counties produce 28% of gross value added of services. Moreover, Vienna also is a leader in gross value added of manufacturing which amount on 30% of total GVA in Austria. These proportions do not change over time.

Vienna is also the location with the highest share of employment in the R&D sector (figure 6.). This is the case in either business or government R&D sector. However, it is noticeable that government contribution is relatively small either in terms of employment and the absolute expenditures for R&D. The government participation is the most important in Vienna. Styria and Upper Austria are also important locations of R&D. They are above the country averages. There is increase in the R&D importance over time among all counties. The weakest performance has Burgenland.

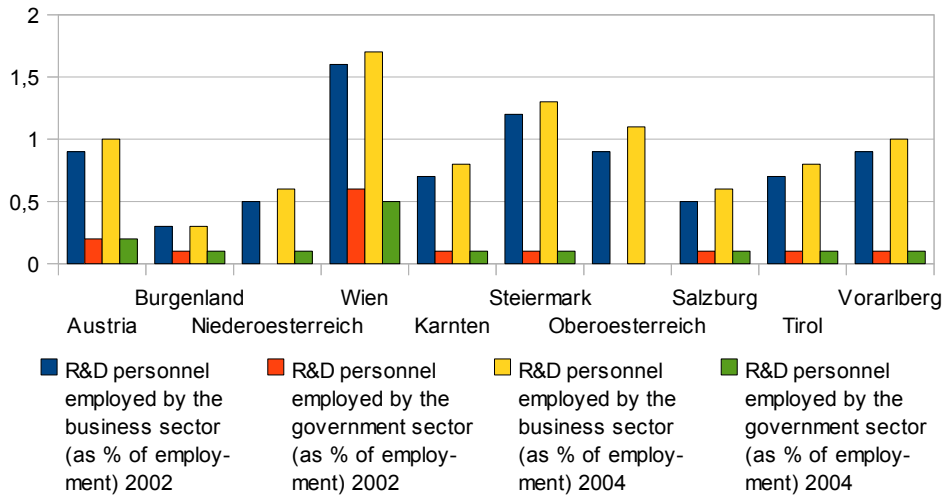
Table 8. Gross Value Added by sectors in Mln Euro in 1996 and 2006

Sector	**GVA_I**	**GVA_II**	**GVA_III**	**GVA_I**	**GVA_II**	**GVA_III**
Year	**1996**			**2006**		
Carinthia	1 066	2 231	3 520	1 521	3 414	5 194
Burgenland	3 135	6 099	9 538	4 522	8 583	13 428
Tyrol	2 841	4 246	7 144	4 292	6 292	10 670
Styria	6 974	12 649	20 336	10 459	18 046	29 280
Lower Austria	3 905	9 207	13 336	6 227	14 048	20 527
Vorarlberg	3 260	8 287	11 709	4 591	11 885	16 676
Salzburg	10 692	14 505	25 954	15 677	22 059	38 515
Upper Austria	8 851	14 474	24 582	12 596	22 707	36 342
Vienna	8 948	35 957	45 029	10 448	51 625	62211

GVA_I – Gross Value Added in primary sector,
GVA_II – Gross Value Added in secondary sector,
GVA_III – Gross Value Added in tertiary sector.

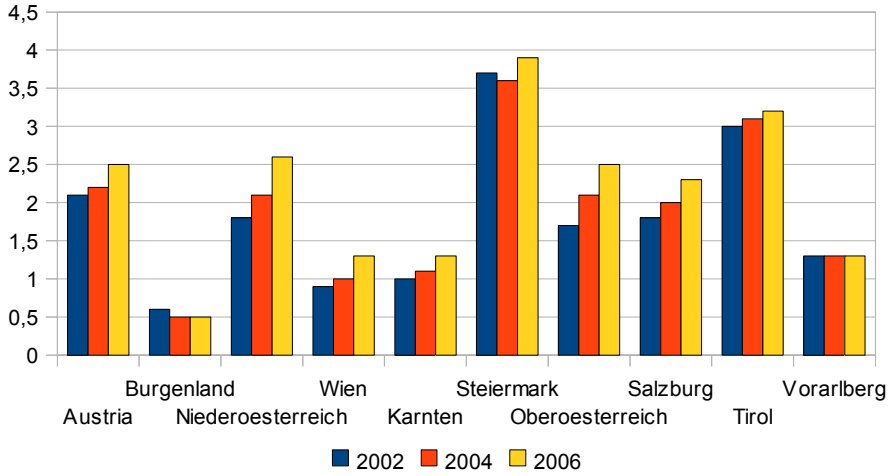
Source: Statistik Austria, http://www.statistik.at/web_en/statistics/regional/regional_accounts/nuts_2-regional_gdp_and_main_aggregates/index.html

Figure 6. R&D employment by sectors and regions in 2002 and 2004



Source: Own elaborations based on OECD, Regional Database.

Figure 7. R&D intensity as % of GDP in 2002, 2004, 2006



Source: Own elaboration based on Statistic Austria, Austrian Economic Atlas (database).

In terms of GDP, the R&D are the more intensive in Styria then in Tyrol. However, the absolute amounts spend in this sector in Vienna are two times higher in comparison with Styria and six times higher with respect to Tyrol. In absolute values, Upper Austria also have important position incurring around 6000 Mln Euro, similarly as Styria.

There are not big differences in the firm density over counties. Almost all have experienced the increase of this factor. Although one would expect the highest firm density in case of Vienna that is not the case over the whole period. The strongest concentration is faced in Vorarlberg over the period 1996-2006. Next positions under this criterion are taken by Vienna and Lower Austria.

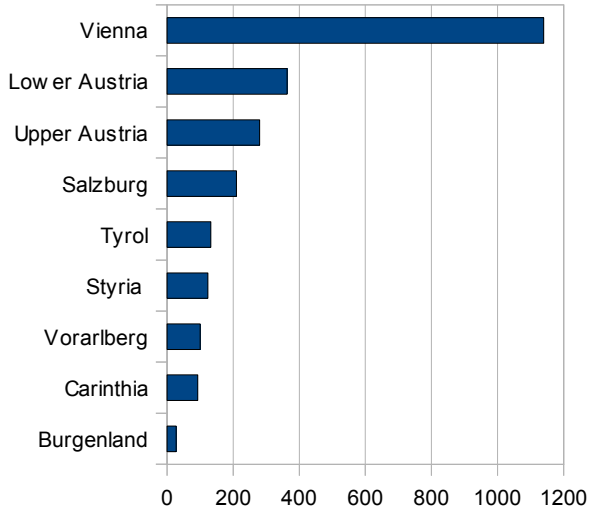
Table 9. Number of firms per km^2 per county

Frirm per km^2	1997	2000	2002	2004	2006	Change
Burgenland	24,5	27,2	31,1	32,2	34,4	140%
Carinthia	16,2	21,8	28,1	29,1	30,5	188%
Lower Austria	22,4	21,8	28,1	29,8	41,9	187%
Salzburg	17,8	20,4	26,4	28,5	30,1	169%
Styria	34	34,7	38,4	40,3	31,7	93%
Tyrol	28,3	29,1	34,2	35,6	37,2	131%
Upper Austria	21,8	23,3	27,4	28,8	30,3	139%
Vienna	26,3	29,2	36,9	38,9	41,2	157%
Vorarlberg	33,9	35	40,4	42	44,3	131%

Source: Own elaboration based on SuperSTAR database, Statistik Austria.

In terms of number of MNE Vienna again outperform the other regions. In 1996 Vienna was location of more than 1100 MNE and in 2006 more than 1200. The proportion of total number of investments is generally constant over the period among provinces. Vienna receives 50% of investments, Lower Austria 15%, Upper Austria 10%, Salzburg 9%. The rest is location of less than 5% each. Burgenland receives the smallest amount, only 1%. This pattern is shown at figure 8. Similar conclusions are brought from the analysis of stock of FDI (table 10.).

Figure 8. Number of foreign firms and FDI stock by province in 2006



Source: Own elaboration based on OeNB (2008).

Table 10. Inward FDI stock in Mln Euro by provinces in chosen years

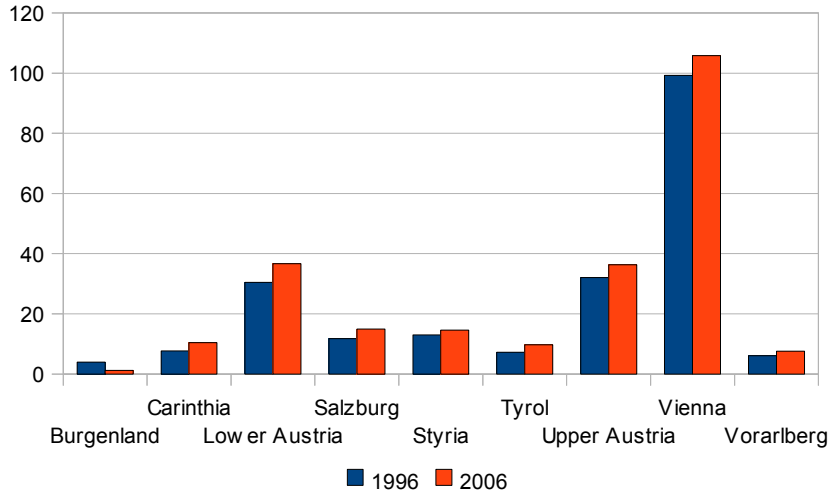
	1996	1998	2000	2002	2004	2006
Burgenland	134	126	221	597	503	639
Carinthia	291	428	1257	1747	1583	1172
Lower Austria	1154	1608	2292	2701	3594	7324
Upper Austria	2460	3144	4409	6230	8785	9326
Salzburg	1218	1500	1997	2479	2877	3404
Styria	747	1257	1333	2451	2414	3727
Tyrol	465	570	861	832	1147	717
Vorarlberg	236	273	456	706	728	867
Vienna	7530	9288	19878	23743	24132	57161

Source: OeNB (1998, 2000, 2002, 2004, 2006, 2008).

The concentration of MNE may be also viewed through employment of MNE

(figure 9.). This proxy additionally shows the engagement in local economy. The more the company is incorporated in local economic activity, the more the local characteristics matter. Vienna exceeds far away from average level of MNE's employment, although it is the smallest county.

Figure 9. Employment in MNE per 1000 employees in 1996 and 2006



Source: OeNB (1998, 2000, 2002, 2004, 2006, 2008).

Table 11. Average amount of FDI among counties in Mln Euro

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Δ
Burgenland	5	4	3	6	6	15	15	13	16	15	24	511
Carinthia	4	4	5	5	14	20	18	19	17	18	13	324
Lower Austria	3	4	4	6	6	7	7	9	10	12	20	582
Salzburg	6	7	7	9	9	10	11	12	12	13	16	271
Styria	8	8	11	11	11	20	19	17	18	27	30	393
Tyrol	5	5	5	7	8	7	7	8	9	8	5	120
Upper Austria	10	12	12	14	16	18	22	24	29	29	33	330
Vienna	6	7	7	10	16	18	19	18	19	27	50	788
Vorarlberg	3	2	3	3	4	6	6	7	7	7	9	345

Δ – change over 1996-2006.
Source: Own elaborations based on OeNB (1998,..., 2008).

Vienna clearly dominates in the number of investors. However, if the value of investment is under consideration, Vienna does not outperform other provinces. The exceptional year is 2006 when the average FDI per investor is 50 Mln Euro. An interesting feature of Burgenland is that during the whole presentation of regional characteristic takes the last position under all considered aspects, but this time is one of the leader locations.

The conclusion after the analysis drawn in this section is that Vienna outperforms in almost all aspect other regions. The surrounding regions as Lower Austria, Upper Austria, Styria with Vienna constitute the main locations of investors. They are the most developed, the most open for R&D. Burgenland that is located close to these counties, generally perform the worse results. However, it does not change the fact that average FDI is 24 Mln Euro much more than half of Austrian regions.

CHAPTER III. EMPIRICAL RESEARCH ON FDI LOCATION WITHIN AUSTRIA

3.1. Theoretical framework

Following Krugman and Venables (1995), Head and Mayer (2004), Amiti and Javorcik (2008) and Spies (2009), this study build the location choice model. This thesis, as many of the new trade and the new growth works, adopts a variant on the monopolistic competition model proposed by Dixit and Stiglitz (1977). The frame of imperfect competition allow for increasing returns. This is particularly important because we may discuss firms' linkages that determine the existence of the agglomeration mechanisms. The firm would not concentrate production in the largest market, but it would rather set up a separate facility to serve each market, if there are not increasing returns to production at the individual firm-level. these increasing returns make the production centres a location consisting of many efficient and diversified suppliers of input goods. (Fujita et al., 2000)

Multinational firms, that decide to carry out investment abroad, face a set of possible location option. For the purpose of this paper, there is assumed to exist three-stage decision process. At the first stage of the game, a firm chooses the mode of international activity (export, a foreign subsidiary). The second stage reflects the choice of the host country. Finally, a firm decides where exactly within the host country it will set up its production. The choice of each possible option affects firms' profits. The decision of each type of firm shapes the supply of the market that, on the other hand, influences prices and quantities, which affect firm profits. Hence, the determination of the final location depends, whether the achievable profits from that certain location outweigh the profits that can be reached in all other alternative locations.

The present analysis assumes that the fundamental investment decisions have already been taken. The only choice, left, is to determine specific location within a host country given the fact that an enterprise decided to be multinational company and to carry out FDI in the particular country (Austria). Due to this any country characteristics that not vary among the host country regions such as taxes are neglected.

Therefore, firms wish to choose the particular province p within a host country, that maximizes expected profits. Namely, a firm will chose the province i if its expected profits will exceed achievable profit at province j for all $i \neq j$, where i, j are possible locations within a chosen country. A single representative firm, investing in a province p of a chosen country and selling in all potential markets j, rise profit given by:

$$\pi_p = \sum_j [p_{pj} x_{pj} - w_p^{\alpha} r_p^{\beta} t_{pj} (P u_p) \mu x_{pj}] - f_p \quad (1)$$

The revenue, $\Sigma_j p_{p,j} x_{pj}$, is driven by the price, $p_{p,j}$, of selling the firm's output $x_{p,j}$ in the j available markets. The firm's profits are reduced by total cost. One of the first cost that a firm must carry out is the cost of establishing a plant in the recipient region p, the cost of the entry, which is sunk fixed cost of the investment, f_p,. As it was already mentioned, fixed costs are higher for foreign than for domestic firms due to informational disadvantages, when entering a new market (Helpman et al., 2004). Firms' networks and proximity to the home country mitigate these disadvantages. Thus, fixed costs are important in location choice decision and may explain part of the regional dispersion of MNEs.

$$f_p = (N_p Z 1_p - \sigma) 1/(1 - \sigma) \quad (2)$$

The fixed cost given by equation (2) is constructed by the inverse of the costs of entry into a host market Z_p (region- and origin country- specific) and the costs of duplicating overhead production of N_p firms (specified by region-, home country- characteristics but also industry-characteristics). In Dixit-Stiglitz framework, σ stands for an elasticity of substitution and play a significant role of an indicator of economies of scale. Neavy (2000) explains that. this is the case because the pattern of demand stimulate clustered firms to produce at a different scale. With high value of σ, the returns to scale are more exploited in contrary to regions with low σ.

Subsequent costs occur with the beginning of the production in the chosen site. Then the company have to employ factors of production, thus incur the expense of the wage in province p, w_p^{α} , and the price of capital, land or any other factor of production in province p, r_p^{β}. The number of entering foreign firms in each province p is assumed to be too small with respect to the total province size to affect the wage. This means that new entrants take the provincial wage as given.

The incumbent foreign firm is assumed to produce final goods, which production process use intermediate input provided by local enterprises. Both final good and intermediate input suppliers are assumed to be producers of a differentiated variety. All varieties of final products enter perfectly symmetrically into the consumer's utility function. All distinct input products also enter symmetrically into the firm's cost function.

This intermediate input is paid in a province p under price index P_p^u, affected by n_s^u, a number of varieties of intermediate input, produced in province s, price of intermediate input,

p^u_s, and the transport costs of shipping a good from province s to p, t^u_{sp}.:

$$P^u_p = [\sum p_{s=1} n_s^u (p^u_s t^u_{sp})^{1-\sigma u}]^{1/(1-\sigma u)} \quad (3)$$

The latter is assumed to take "iceberg" form proposed by Samuelson (1952) and incorporated into the model of Dixit-Stiglitz (1977). This simplification replaces the need for modelling a separate transport industry. Samuelsonian transport costs presume that only a fraction of the original unit arrives, the rest of a shipped variety melt away (as ice) or evaporate (1-{1/t}). The iceberg transport technology implies, when a variety produced in region s and sold at price p^u_{sp} ($t \geq 1$), that the price of delivery to each region p is given by:

$$p^u_{sp} = p^u_s t^u_{sp} \quad (4)$$

The same is true for transport costs, $t_{p,j}$, incurred by the final good producer (see equation (5)). There is free trade if $t = 1$, and in contrast, if $t = \infty$, there is no trade. As Venables (2002) notices, that high transport intensity goods will tend to be settled at locations that are close to the market with adjustment for endowments-abundance. It may give rise to agglomeration effects that affects geographical distribution of international activity.

$$p_{pj} = p_p t_{pj} \Rightarrow p_p = p_{pj}/t_{pj} \quad (5)$$

Proceeding according to profit maximization leads to the marginal revenue equal to marginal cost. The final producer price (equation (6))is constructed as a proportionate of marginal cost (MC) adjusted by transport costs, where $MC = w_p^{\alpha} r_p^{\beta} (P^u_p)^{\mu}$ and θ is the mark-up over marginal cost, affected negatively by the elasticities of substitution:

$$p_p = w_p^{\alpha} r_p^{\beta} (P^u_p)^{\mu} t_{pj} \theta, \ \theta = \sigma/(\sigma-1) \quad (6)$$

A foreign firm settled in province p may sell its output at potential market, which is the local market (region p), but also market of other provinces or even other countries. Therefore, total output is divided between output intended for sell locally and internationally:

$$x_p = D_p + \sum_s P_{=1} D_{ps} + \sum_c C_{=1} D_{pw} \quad (7)$$

where D_p stands for demand for firm's goods in province p, D_{ps} - demand for firm's goods produced in province p and sold within other regions in a host country and D_{pw} is world's demand for final goods from province p (export).

Three types of demand for goods produced in province *p* are given, respectively, by:

$$D_p = p^{-\sigma}_p t^{1-\sigma}_{pp} E_s (P_p)^{\sigma-1} \quad (8A)$$

$$D_p = p^{-\sigma}_p t^{1-\sigma}_{ps} E_s (P_s)^{\sigma-1} \quad (8B)$$

$$D_p = p^{-\sigma}_p t^{1-\sigma}_{pw} E_s (P_w)^{\sigma-1} \quad (8C)$$

E is a term for expenditures, made by both consumers and firms, where downstream firms spendings are a proportion μ of their total revenue. The elasticity of demand is assumed to represents consumer preferences that not vary across provinces. Summing these three equations, the aggregate demand is derived, which is equal to supply in the equilibrium under market clearing condition, thus:

$$x_p = p^{-\sigma}_p [t^{1-\sigma}_{pp} E_s (P_p)^{\sigma-1} + \sum_s P_{=1} t^{1-\sigma}_{ps} E_s (P_s)^{\sigma-1} + \sum_c C_{=1} t^{1-\sigma}_{pw} E_s (P_w)^{\sigma-1}] \quad (9)$$

After substitution the sunk fixed cost function (2), the product market condition (9) and profit maximizing prices (6) into the profit function (1), profits are defined as:

$$\pi_p = \sigma^{-1}(w_p^{\alpha} r_p^{\beta}(P^{u}_p)^{\mu} t_{pj})^{\sigma-1} [\sigma/(\sigma-1)^{1-\sigma}]\{p^{-\sigma}_p t^{1-\sigma}_{pp} E_s(P_p)^{\sigma-1} + \\ + \sum_s P_{=1} p^{-\sigma}_p t^{1-\sigma}_{ps} E_s(P_s)^{\sigma-1} + \sum_c C_{=1} p^{-\sigma}_p t^{1-\sigma}_{pw} E_s(P_w)^{\sigma-1}\} - (N_p Z^{1-\sigma}_p)^{1/(1-\sigma)} \quad (10)$$

All variables may change potential profits across alternatives and induce entry or exit of multinational firms. Firms are free to enter or exit the market and these changes are instantaneously adjusted. Therefore, the equation (10) is equalised to zero and the optimal $n_{p,t}$ number of firms in each province in each period *t* may be expressed as:

$$n_{pt} = f_t (\pi_p) \quad (11)$$

Denoted by Δ, the first differences are:

$$\Delta n_{pt} = n_{pt} - n_{pt-1} = f(\pi_{p,t} - \pi_{p,t-1}) \quad (12)$$

Any exogenous change of the variables, such as transport costs, factor prices that affect an incumbent firm's profit, influence also the decisions of further entries or exits. This happens until profits are driven to zero.

The equation (10) is non linear and it is not possible to get an explicit reduced form

solution for the number of firms in each period *t*. Thus, for further analysis the function f_t is set as $f_t = \ln(\pi_{pt})$ and equation (10) will be used in log-linear form, to make it empirically tractable:

$$\ln\pi_{pt} = \alpha\,(1-\sigma)\,\ln w_p + \beta\,(1-\sigma)\,\ln r_p + \mu(1-\sigma)\ln(P^u_p) + (1-\sigma)\ln t_{pj} +$$
$$+ [\sigma/(\sigma-1)^{1-\sigma}]\,\ln\{p^{-\sigma}_p\, t^{1-\sigma}_{p\_p}\, E_p\,(P_p)^{\sigma-1} + \sum_{s=1} P^{-\sigma}_p\, t^{1-\sigma}_{p\_s}\, E_s\,(P_s)^{\sigma-1} + \quad (13)$$
$$+ \sum_{c=1} C^{-\sigma}_p\, t^{1-\sigma}_{p\_w}\, E_w\,(P_w)^{\sigma-1}\} - 1/(1-\sigma)\ln N_p - \ln Z_p$$

The first two components of the equation (13), wages and price of capital, are observable. However, in this study the cost of capital will be neglected due to lack of variance across counties. The next component proxies so called Supply Access (Sa_p) which represents the access to the intermediate input supply in the province *p* by a foreign firm. The lower P^u_p, the intermediate input price index is, the higher the profit. Following equation (4), we may draw further conclusions. More differentiated intermediate input goods availability and lower cost of accessing these goods result in a lower price index which implies higher profits.

The forth element represents transport costs. In the further analysis, there are determine 3 types of these costs: transport costs only within province *p*, t_{ppt}; transport costs of shipping goods to other provinces *s*, t_{pst} and transport costs of shipping goods to other countries *w* in the world, t_{pwt}. The first, t_{ppt}, together with following term in equation (13), constitute one of the measures of market access (MA), or better to say, adjust measure of MA by differentiated transport costs between counties. Market Access (Market Potential, MA) measures the market size, the demand of consumers and other firms for a firm's product. MNEs choosing given geographic location consider its ability to serve potential markets. The MA is defined as:

$$MA_L = p^{-\sigma}_L\, t^{1-\sigma}_{L\_L}\, E_L\,(P_L)^{\sigma-1} \quad (14)$$

L stands for location, considered as a potential market. *L*= *p* views the province, where a firm is established, as internal potential market and presents demand conditions within the chosen province. *L=s* means that other provinces *s* define the potential market for firm's varieties. This represents external potential market but still within chosen country. Other type of external market is market served trough export. It is captured by the equation (14) when *L=w.* This refers to the potential market located outside the chosen country. Theory access it as a positive determinant of location choice because proximity to the market for its output higher the profits form chosen location. The listed options represent three types of potential

market that may be reached by a firm. The division on internal and external MA has already been studied and implemented into the location choice of FDI model by Spies (2009). However, the analysis provided here adds also third type which covers the issue of the FDI-export platform discussed, for example by Ekholm et al. (2003). The potential market in neighbouring countries may be particularly important for small countries being a member of the preferential trade organizations as Austria being a member of the EU.

Hence, the total market that is accessible from the chosen location *p* maybe expressed as weighted sum of market sizes of province *p*, neighbouring provinces and neighbouring countries. This sum will be called "market potential of the chosen province *p*" (MP_P). This concept was introduced by Harris (1954). In this study, the term "market access" will be assign directly to market size, while "market potential" will mean the market size of a particular location adjusted by cost of accessibility.

This access cost constitutes the cost of getting to a customer and any transactions costs related to the location of the demand. A commonly used proxy for it is transport costs which are modelled as a function of the distance between investment site and the demand site. The reason behind it is the fact that as the distance grows the cost of providing firm's products to a given consumer is likely to raise the further the firm is located. The other argument of the transport costs function is availability of infrastructure such as the number of sea berths, river berths, air ports but also the length of rail roads, roads and telecommunication facilities. However, the most important is quality and density of infrastructure between two sites. This model assumes the equivalence of the access costs and transport costs $t_{L\,P}$, which is presented by distance ($D_{L\,P}$). Because of the existence of these costs the market size of each location has to be adjusted by these costs. Thus, the market potential of location *p* is:

$$MP_P = \lambda_p \, adMA_p + \sum \lambda_s \, adMA_s + \sum \lambda_w \, adMA_w \qquad (15)$$

It would be wrong to treat these three types of markets equally important. Thus, in equation (15), each type gets the parameter λ_L to account for it. This parameter covers also interactions, relations between locations. Some location *p* may have better connections with location *s* than with other alternative sites. This issue includes political, cultural and historical ties. The term $adMA_L$ stands for the adjusted market access of the location of the demand. It is calculated as:

$$adMA_L = MA_L / t_{LP} \qquad (16)$$

It was assumed that transport costs are measured by distance $D_{LP} = t_{L\,P.}$ Moreover, there are no access costs within the province *p* so MA_p stays unchanged and is equal to adjusted market access. Therefore, after subtracting above specifications, the market potential of province *p* takes the form of:

$$MP_P = \lambda_p\, MA_p + \lambda_s\, MA_s\, /t_{sp} + \lambda_w\, MA_w\, /t_{wp} \qquad (17)$$

Supply Access, discussed earlier, could be also constructed on the same bases. It includes the range of intermediate inputs outsourced from a given province or from other provinces. The external market would explain the issue of import. However, this model extends only the market potential for simplicity.

Other determinants of FDI location decisions within a country are N_{pt} and $Z_{p.}$ that come from a sunk fixed cost function (equation (2)) They capture network effects. The former, which differ across provinces and time, is a proxy for number of firms and existing product variety, that is located in the province *p*. In case of international activities, it is important to distinguish the MNE already acting at the market. They are different form domestic companies due to asymmetry of information and worse starting position when considering the familiarity with the particular market.

Z_p constitutes fixed effects for each region to account for unobservable heterogeneity among alternative location, for example the elasticity of substitution σ. All mentioned variables may vary over time. Implementation of all of them into the equation (13) construct the estimation equation. However, it also takes into account time fixed effects, v_p, and an error term, ε_{pt} - a random term observed by firms but not by econometricians:

$$\ln\pi_{pt} = \gamma 0 \ln w_{pt} + \gamma 1 \ln r_{pt} + \gamma 2 SA_{pt} + \gamma 3\, t_{ppt} + \gamma 4 \ln MA_{pt} + \\ + \gamma 5 \ln \textstyle\sum_s (MA_{st} / t_{pst}) + \gamma 6 \ln \sum_w (MA_{wt} / t_{pwt}) + \gamma 7 \ln N_{pt} + \gamma 8 \ln Z_p + v_p + \varepsilon_{pt} \qquad (18)$$

3.2. Research hypotheses

The theoretical model, presented in the last section, allows to characterize the influence of the particular determinants of the profit and, therefore, the location choice. This gives basis for determination of the research hypotheses.

One way to increase profits is to minimize costs, given constant revenue components. Generally, firms may cut cost through the lower factor prices or the lower intermediate input prices. The multinational firm is predicted to choose location that provides both or one of

these cost elements at a lower price. Therefore, the higher wages are the lower incentive for FDI in a given county (Bartik, 1985; Coughlin et al., 1991). The higher intermediate inputs price is the lower incentive for FDI location in this region.

The geography of FDI is determined by the geography of production within the chosen country. The author believes that geography matters and exhibits the linkages between market agents. Due to the existence of different types of agents and their activity at the market, there are few interactions that influence the location choice. They reflect Marshallian externalities (Marshall, 1920) discussed in the literature revision. First, MNE prefers locations in the adjacency of potential suppliers that provide developed and diversified intermediate inputs (Amiti & Javorcik, 2008). The proximity affects the price of intermediate outputs.

Secondly, incumbent firms settle in regions that have already been recipient of many firms or even many FDI. Firms may share the information on how to operate efficiently in a new economic environment. Moreover, the existence of other foreign enterprises informs whether economic and business conditions at potentially host region are favourable for an international activity. The information is easier spread and makes the start up easier to conduct. Then, the information disadvantages are mitigated and profits increase. The higher is the number of already established foreign firms, the higher is the flow of FDI.

The MNE locates its foreign subsidiaries close to the consumers. This mitigates cost of transactions. Thus, the higher population density is the higher agglomeration of international firms. The proximity to consumers also implies the proximity to potential employees. The bigger is the market for goods, produced by MNE, the more the region is attractive for FDI. The attractiveness increase with decrease of the transport costs from chosen province to target market. In such economic and business environment, it is easier to provide profitable activity.

3.3. Empirical methodology[11]

Most of empirical papers use discrete choice models[12] to study the firm location choice. This is the result of the nature of the phenomenon that is studied. Number of foreign direct investors engaging in the international activity in a given county is a count. The count variable is the quantitative variable with nonnegative integer values. The widely used model to study count data outcomes is Poisson Regression Model (Wooldrige, 2002).

Poisson regression assumes that data follows a Poisson distribution. The Poisson

11 This section is based on Greene (2000), Wooldrige (2002).

12 Alternatively, to study discussed issue Head et al (1994, 1999) use the conditional logit model. Crozet et al. (2004) and Spies (2009) use Nested Logit Model. Mota et al. (2006) make use of negative binomial model.

distribution is based on assumptions that restricts the conditional moments of dependent variable *y*. They are often violated in applications. Contrary to traditional regression that assumes a symmetric distribution of errors, the Poisson distribution is skewed. The first assumption imposes the equality of the conditional mean and variance so the variance increases as the mean increases under the Poisson distribution. :

$$E[y_i \mid x_i] = Var[y_i \mid x_i] \tag{19}$$

The next assumption allows the variance-mean ratio to be any positive constant, where $\sigma^2 > 0$ is the variance-mean ratio:

$$Var[y_p \mid x_p] = \sigma^2 E[y_p \mid x_p] \tag{20}$$

The case of $\sigma^2 < 0$ implies that the variance is greater than the mean which is called "overdispersion". In opposite case $\sigma^2 > 1$ there is "underdispertion.

The Poisson Regression Model implies a log transformation which adjusts for the skewness, prevents the model from producing negative values and models the variance as a function of the mean. The alternative to the Poisson Regression Model is the Negative Binomial model, however the software has problems with computation of results, thus, in this study the first model is applied.

Model specifies the dependent count variable for observation p (with p=1, ...,n), y_p, as a Poisson random variate with a mean λ_p which is related to the explanatory variables x_i and a matching parameters β . The probability of observing y_p is:

$$Prob(Y=y_p)= \frac{e^{-\lambda p} \lambda p_i^{y}}{y_p!} \quad , y_p= 0, 1, 2, \ldots \tag{21}$$

λ_i is commonly formulated as the log linear form thus $\ln \lambda_p=\beta' x_p$. The conditional mean of y_i, that shows the number of events period, is expressed by:

$$E[y_p \mid x_p]= Var[y_p \mid x_p] = \lambda_p = e^{\beta' xp} \text{ , where } \ln \lambda_p=\beta' x_p, \text{ so}$$
$$\frac{\partial E[y_p \mid x_p]}{\partial x_p} = \lambda_p \beta \tag{22}$$

This mean is nonlinear which implies that the effect of a change in x_p depends on two factors, namely on coefficient β and the value of x_p The Poisson Regression Model differ from

the linear regression because it does not contain a random error term in the pure form. Thus, it is not derived from the joint density of random error but from the distribution of *y*.

This methodology is implied for panel data. Therefore, assuming fixed effects α_p, the Poisson distribution is assumed to have conditional mean:

$$\log \lambda_{pt} = \beta' x_{pt} + \alpha_p \tag{23}$$

The estimator that does not include the fixed effects is obtained by the joint distribution of $(y_{p1}, ..., y_{pt})$ conditional on the sum, where *p* stands for province and *t* for time:

$$p(y_{p1}, ..., y_{pt} \mid \sum y_{pt}) = [(\sum y_{pt})!/(\prod y_{pt}!)] \prod p_{pt} \tag{24}$$

$$\text{where } p_{pt} = \frac{e^{\beta' Xpt + \alpha p}}{\sum e^{\beta' Xpt + \alpha p}} = \frac{e^{\beta' Xpt}}{\sum e^{\beta' Xpt}} \tag{25}$$

The province *p* have contribute to the conditional log-likelihood according to:

$$\log L_{pt} = \sum y_{pt} \log p_{pt} \tag{26}$$

The fixed effects have the same nature as in the regression case. The effects, that are not estimated, do not have to be uncorrelated with the exogenous variable. The random effect model is an alternative if the uncorrelatedness of independent variables and effects can be maintained. In this case, the joint distribution takes the form of:

$$p(y_{p1}, ..., y_{pt} \mid \sum u_p) = (y_{pt} \mid u_p) \prod p_{pt} \tag{27}$$

The model was examined by the link test. The link test performs a model specification link test for single-equation models. It is based on the idea that if a regression is properly specified, one should not be able to find any additional significant independent variables except by chance. The test of _hatsq is not significant, thus, it fails to reject the assumption that the model is specified properly. It seems the model does not have a specification error and the model was correctly specified.

3.4. Data description

Investors' valuation of all determinants can not be directly observed. The actual profit in

a certain location can not be observed either. However, the analysis is provided with use of the regional characteristics at time the investor takes the decision to select an exact location from the set of potential sites. The empirical studies on FDI and MNE are constrained by the lack of reliable data. The analysis of location choice would be the most accurate when it would use firm-based data because a firm is a decision maker.

However, due to lack of access to such firm-level data on Austria, the research is conducted on aggregate data on county-level over the period 1996-2006. The period of observations is reduced by one year. This is a result assumption that the decision process regards to establishing new activity abroad is a sequence of events that account the information collected by potential investor in previous period. The present attractiveness of a given location is strongly related with its past attractiveness. Thus, the dependent variable, which is the number of foreign firms across counties (1997-2006) are paired with the values for independent variables from previous year (1996-2005). Hence, there are cross-sectional time series on province $p = 1, ..., 9$ and $t = 1, ..., 10$, so the sample contains 90 observations (table 13.).

Dataset is collected from few sources.[13] The main variable of interest is Foreign Direct Investment. It is measured by two variables, the number of foreign firms (FDI_no) and the stock amount of FDI in a given province and in a given year. The information on the level of these variables is collected by the Oesterreichische Nationalbank (Austrian National Bank, OeNB). They are conducted on the bases of the balance of payments' statistics and survey of Austrian investment position. Austrian National Bank performs surveys of FDI in Austria since 1969 and Austrian outward direct investment abroad since 1974. Since 1990 the surveys appear annually. However, the results are available with an 18 month delay. Thus, the dataset are limited to year 2006.

The definition of Foreign Direct Investment applied by OeNB is in line with the concept applied by IMF and OECD. FDI are capital investment by non-residents for the purpose of establishing and maintaining lasting economic relations with a domestic enterprise with the intention of exercising and effective influence on its management. The investors are assumed to be a non-resident that owns at least 10% and the nominal value of shares exceeds 72 000 Euro (till 1999 the threshold was ATS 1 Million).Since 2006 this threshold raise to 100 000 Euro. (OeNB, 2008)

The explanatory variables may be grouped into four categories of location choice determinants (table 12.): (1) demand conditions, (2) labour conditions, (3) supply conditions

13 For detailed list of sources look to the Appendix A.

and (4) agglomeration indicators. These data were collected from SuperSTAR Database of Austrian Statistical Office (Statistik Austria) and Regional Database of OECD.

Table 12. Definitions of variables used in the model

Label	Variable
FDI	
FDI_no	Number of foreign firms in each county
FDI	Inward stock FDI per county
DEMAND CONDITIONS	
POP	Population per county
POP_den	Population density per county = total county population/county area
MA_P	Market access in chosen province
MA_OP	Market access in other provinces measured by gdp per capita discounted by distance between capital cities of provinces
MA_OC	Market access in neighbouring countries measured by gdp per capita discounted by distance between capital cities between countries and chosen province
LABOUR CONDITIONS	
WAGE	Gross average annual wage in each county
POP_15_64	Population in age between 15-64 per county
UNEMPLOY_r	Unemployment rate per county
EDU_iii	% of labour force with tertiary education per county
SUPPLY CONDITIONS	
KIS_serv	Knowledge intensive services as a % of total services
GVA_IIsec	Gross Value Added at basic price in the secondary sector by county
GVA_IIIsec	Gross Value Added at basic price in the tertiary sector by county
AGGLOMERATION CONDITIONS	
FIRMno	Number of firms in each county
FIRMden	Firm density in each county
MANUFACTden	Manufacturing density in each county = = manufacturing employment/area of a county

Source: Own elaboration.

MNEs settle close to consumers. The section on the theoretical framework has already given the insight behind implementing the market potential measure. The market size is expressed by GDP per capita. However, the borders of regions do not constitute the borders of

accessible market. Thus, the market potential includes 3 discussed earlier types of market potential: (1) Market access of a given province with GDP per capita of this province (MA_P), (2) Market access of other provinces with discounted GDP per capita of this province (MA_OP) and (3) Market access to other countries with discounted GDP per capita of this country (MA_OC). The distance is measured between capital city of a given location and capital city of potentially accessible province or country. The simplification on distance and transport costs equivalence allows avoiding concerns on appropriate cost measure, modes of transport and types of goods. The distance was calculated on the web-pages.

Another of the demand condition is population at given province (POP). However, the absolute number of inhabitants neglects the issue of proximity. Thus, the population density (POP_DEN) in a given region is considered to cover it. Besides being the direct demand indicator, it may also describe agglomeration economies. The concentration of consumers is equivalent to concentration of labour which makes the location more attractive for MNE as an employer.

There are also the labour market conditions that are presented by cost of labour and availability of labour. The cost is represented by the gross annual wage in each county (WAGE). Higher wages are expected to deter MNE activity. However, the empirical literature does not predict any clear interaction between wage and FDI. It might be non-significant and/or positive correlated with FDI (Head et al. 1999). The latter is a result of wage that capture also the quality of labour force. The other descriptive regressor is tertiary education level (EDU_iii). It is constructed as a % of labour force and thus shows the size of qualified labour force. The model considers also the size of potential labour market by using the measure of all people in productive age (POP_15_64). The availability of labour force is also measured by unemployment rate (UNEMPLOY_r). However, it also may capture the issue of labour quality because very high unemployment rate indicates that the available work force does not meet the MNE' needs.

The third group of estimators are proxies of supply access that affects the costs of international activity. These set of measures is the most indirect one. It combines the share of knowledge intensive services (KIS) and gross value added by secondary sector (industry, GVA_ii) and tertiary sector (services, GVA_iii). These measures capture the concentration of a given type of activity potentially used as a intermediate input. The concentration affects the price which affects costs of an investor. Knowledge intensive services provide the support for the business process using scientific and technological knowledge, R&D services. This may improve the productivity of international activity. Gross Value Added measures are proxies of

the differentiation of intermediate input and their price.

The last set of variables covers the phenomenon of agglomeration of production activity cross borders of regions within chosen country (Head et al. 1995; Hilber, 2007). The spatial concentration creates the favourable economic environment that supports further concentration process. The self-reinforcement is a feature of special interest of governments that want to maintain the development of regions by economic activity. The number of already existing firms (FIRMNO) and their density (FIRMDEN) indicates firms' competition but also potential source of information or qualified workers on a given market. Because of these to opposite effects among agglomeration characteristics, one may find the manufacturing density (MANUFACTDEN) in terms of employment.

Table 13. Summary statistics of all variables

Variable	Obs	Mean	Std. Dev.	Min	Max
fdi_no	99	285.3939	354.3896	27	1292
fdi	99	4208.282	8074.847	119.18	57161
labor_mne	99	25.83131	31.33875	1.2	120.2
pop	99	897397.2	496132.4	276083	1657559
pop_den	99	507.6768	1207.368	52	4060
gdp	99	23728.92	16076.3	3935	68743
ma_p	99	24667.68	5845.072	13800	40400
ma_op	99	1229.126	376.0015	560.87	2091.9
ma_oc	99	453.417	104.9607	287.67	725.97
wage	99	6459.27	5190.502	866.8	21582.1
pop_15_64	99	605102.9	334713.9	184034	1148688
unemploy_r	99	3.919192	1.392669	1.9	9.1
edu_iii	99	15.34343	3.011717	11.4	25.6
know_in_serv	99	42.93535	4.203019	36	56.9
gva_iisec	99	6452.737	3781.2	1066	15677
gva_iiisec	99	14498.27	11624.45	2231	51625
firmno	90	26507.8	14743.37	4487	68319
firmden	90	30.37	6.633359	16.2	44.3
manufactden	99	35.67758	76.23407	4.24	289.99

Source: Elaboration from STATA.

According to Head et al. (1995), Head and Ries (1996) FDI attracts further FDI. The issue is covered by the variable stock FDI as a proxy of already existing foreign firms at the market. The inclusion of this cumulative count of affiliates activity captures any omitted

regressor that makes a specific county particularly attractive to the MNE. These agglomeration indicators facilitate the market entry of MNE, the fixed costs of appearing on a given market. Developed agglomeration combine all this conditions presented above and then become the centre, pool of demand, inputs of production, supply and create spillovers that multiple the effects.

3.5. Results

This section discusses the results of panel regression model and Poisson panel regression model. Regressions include all discussed variables to test research hypotheses. Thus, the proxies of demand conditions, labour conditions, supply conditions and agglomerations conditions appear in the model. There were few proxies per each type of conditions, thus, regression provides few version of model construction. The table 14. and 15 present results of panel regression model. The table 16. includes estimation in case of adding the time and county effects. The coefficients of years and counties in panel regression are presented n Appendix C. and Appendix D.

Each combination of the variables is considered with and without time effect. Additionally, the table 15. provides estimates of model that includes also dummy variables for provinces. This procedure accounts for individual effects for each region. The benchmark for dummy variables is Vienna. This choice has base on the fact that Vienna outperforms other counties in many aspects, for instance in the number of investors. All combinations of model use MA_P, MA_OC and MA_OP with POP_DEN as proxies of market size, demand conditions. The labour conditions are incorporated into the model through wages, unemployment rate and POP_15_64. Moreover, EDU_iii was added in order to account for quality of labour. GVA_iiisec and GVA_iisec represnt the supply access and its price. The link test fails to reject the assumption that the model is specified properly. It seems the model does not have a specification error and the model was correctly specified.

Table 14. Estimation results of panel regression (first and second version)

Variable[14]	**(1)**		**(2)**	
ma_p1	.01463626***	.02782605***	.0101552***	.02695837***
pop_den1	.00003258***	.00001841*	.00005151***	.00001511
ma_oc1	-.12064037	.46483367***	-.15290094**	.4610133***

14 "1" after the name of variable indicate that this variable was lagged 1 period.

Variable	(1)		(2)	
ma_op1	.09572678***	.16343679***	.09851628***	.16641813***
fdi1	-.01137071***	-.01398081***	-.01189161***	-.0136802***
wage1	.10605401***	.09803711***	.11052234***	.09659574***
unemploy_r1	-17.763737***	-8.6811324	-23.857979***	-8.9181921
firmden1	3.2092056	.12139858		
pop_15_641	.00036142***	.00026201**	.00031262***	.00021673**
gva_iisec1	-.05334704***	-.03943822***	-.04386186***	-.03734991***
gva_iiisec1	-.02644843***	-.02240596***	-.03167894***	-.02088334***
edu_iii1	6.2129818	1.3095894	7.6155832*	1.8338974
manufactden1			.48207074	.17448999
_cons	-252.05278*	-1103.8268**	-222.0604**	-843.31395**
time effects	no	yes	no	yes
chi2	8050.2882	11876.139	8964.4444	13424.084
_hat	1.027592***	1.019543***	1.009268***	1.019299***
_hatsq	-.0000205	-.0000146	-6.91e-06	-.0000144
_cons	-3.714339	-2.616902	-1.235785	-2.563609

* p<.1; ** p<.05; *** p<.01

The column (1) uses FIRMDEN and FDI as a representation of agglomeration economies. The column (2) changes the measure of agglomeration for manufacturing density. Both types of measure enter the equation with positive sign but are insignificant. The market potential is significant in these specifications. Only the component that refers to the market size of neighbours is a disincentive for the investment in the region. The third application (table 15.) uses alternative measure of supply conditions which is KNOW_IN_SERV (knowledge intensive services, KIS) and apply to the first set of variables. Additionally, the model instead of population in age 15-64 considers total population (POP). However, it keeps its positive influence and significance.

Table 15. Estimation results of panel regression (third version)

Variable	(3)	
ma_p1	.00515876	.02690247***
pop_den1	.00005398***	.00002112***
ma_oc1	-.34715074***	.57975579***
ma_op1	.12187709***	.21705642***
fdi1	-.01050427***	-.01521692***
wage1	.0246138*	.03955868***

Variable	(3)	
unemploy_r1	-16.46128*	-8.757401
edu_iii1	12.019545**	1.4180929
firmden1	1.5506762	2.0045464
pop1	3.059e-06	.00003802
know_in_s~v1	2.1815023	7.1373593**
_cons	-210.16456	-1637.1787***
time effects	no	yes
chi2	4697.3145	8274.8686
_hat	.9623265	.9910191
_hatsq	.000028	6.70e-06
_cons	5.083354	1.20293

* p<.1; ** p<.05; *** p<.01

The investors appear in locations with higher population density of well-paid and well-educated labour. Contrary to theoretical predictions the wage has positive influence on FDI occurrence. This probably reflects the need for qualified workers but also competition for labour force. MNEs are prone to pay more to get qualified labour at competitive market. The interesting result is the negative impact of the value of previous foreign investments. The locations with high foreign direct investments are not so attractive for MNE. The KIS are a motivator for investors. The more is knowledge intensive services the more attractive is the location. The population density indicates the concentration in proximity to consumers. The agglomeration economies with respect to producers are not strictly defined.

The regression with county effects provides similar results with one interesting exception. The unemployment rate changes the sign for positive one. Since the base for dummy variables is Vienna that have almost the double unemployment rate in comparison with other regions the result is finally understandable. As it is shown in Appendix C. the investment in Vienna lowers substantially the FDI in other regions.

Table 16. Estimation results of panel regression with county effects and time effects

Variable	(4)	(5)	(6)
ma_p1	.0048871	.00398522	.01329291***
pop_den1	.00007012***	.00005812**	.00004868**
ma_oc1	.35651018**	.26109153*	.43486704**
ma_op1	-.21411757***	-.14443265**	-.13916135

Variable	(4)	(5)	(6)
fdi1	-.00894142***	-.00917033**	-.00609885***
wage1	.01835346***	.02683344**	.02876971***
unemploy_r1	4.1651871	3.1143605	3.634841
edu_iii1	1.464756	1.0812969	1.5102846
firmden1	.5504404		-.40350202
pop_15_641	.00042095	1.533e-06	
gva_iisec1	-.01787999***	-.0125643**	
gva_iiisec1	.01427916***	.01008473**	
manufactden1		.52615013	
pop1			.000318
know_in_s~v1			2.2285516**
_cons	1190.6954**	1564.4984**	381.05478
chi2	176823.26	198584.11	128863.87
_hat	.9956194***	.9957864	.9922317
_hatsq	3.28e-06	3.16e-06	5.82e-06
_cons	.5811286	.5544538	1.030114

* p<.1; ** p<.05; *** p<.01

Further analysis of the location choice is conducted based on results of Poisson regression model (table 17.). Specification (7) refers to panel regression (1) and other respectively to (2) and (3). According to estimation results market size of chosen province is significant and positive. The other markets, namely abroad and other provinces lower the incentive to invest. The other significant variable is FDI that still takes a negative sign. Contrary to previous results, here, only gross value added in industry negatively affects the investors. Investors are interested in locations close to highly productive service sector. Thus, in table 18. KNOW_IN_SERV are incorporated into analysis. Under Poisson methodology many variables lose their significance, for instance WAGE, GVA in both sectors. Also population density becomes insignificant. However, local market size (MA_P), FDI and POP_15_64 stay important. The unemployment rate becomes insignificant when time effects are added.

Table 17. Estimation results of Poisson panel regression (first and second version)

Variable	(7)		(8)	
ma_p1	.00002748**	.00002601	.00002755**	.00001612

Variable	(7)		(8)	
pop_den1	3.972e-08	5.698e-08*	.00021314	.0002983**
ma_oc1	-.00096889	-.00063225	-.00044104	-.00025255
ma_op1	-.00021983	-.0003227	-.00029418	-.00039399
fdi1	-.00001408***	-9.395e-06	-.00001306***	-7.248e-06
wage1	.00001391	.00002033	.00001682	.00002005
unemploy _r1	-.0473497**	-.03454548	-.04258531**	-.03214296
pop_15_641	1.605e-06***	1.380e-06**	1.524e-06***	1.442e-06***
gva_iisec1	-4.323e-06	.00002191	1.387e-06	.00002432
gva_iiisec1	.00001243	1.707e-06	8.400e-06	-4.231e-06
edu_iii1	.01586901*	.008901	.01148014	.01038314
firmden1	.0027188	.00389964		
manufactden1		.	.00207561	.00245899
_cons	3.8668634***	4.1606746**	3.8574267***	4.1010959***
time effects	no	yes	no	yes
lnalpha_cons	-2.6061348***	-2.380382***	-2.4950312***	-2.2731419***
chi2	110.56633	98.553557	108.61537	102.00702
aic	669.73714	680.99813	737.02845	744.99411
bic	703.25943	733.67601	772.02579	799.98993

p<.1; ** p<.05; *** p<.01

Under the specification (9) FDI are affected by market access, population density, FDI, unemployment. Education becomes not significant.

Table 18. Estimation results of Poisson panel regression (third version)

Variable	(9)	
ma_p1	.00002834**	.00002633
pop_den1_2	4.562e-08*	5.417e-08*
ma_oc1	-.00082113	-.00060204
ma_op1	-.00025063	-.00034265
fdi1	-.00001221***	-.00001035**
wage1	.00003133	.00002821
unemploy_r1	-.04629886**	-.04364643
pop1	1.050e-06***	1.079e-06***
know_in_s~v1	.00983899	.00578597
edu_iii1	.01267876	.00519465
firmden1	.00207561	.00245899
_cons	3.5100514***	3.9784425***

Variable	(9)	
time effects	no	yes
lnalpha_cons	-2.5732278***	-2.4173993***
chi2	109.80139	102.44641
aic	666.1199	678.5066
bic	697.24774	728.79003

* p<.1; ** p<.05; *** p<.01

In case of Poisson regression STATA did not managed to converge a solution with counties effects thus they are not discussed here. Nevertheless, the results confirm the results of OeNB survey that FDI are seeking for market access. Locations with high population density, high wages construct a good environment for FDI. However, the FDI rather not follow already intensive international activity.

CONCLUSIONS

FDI is widely seen as a combination of capital, technology, marketing and management. The policy makers may exploit the existence of MNE as an element in the country strategy for economic development and mitigation of inequality within country borders. Recipient country characteristics affect the international activities. A country is a set of many possible locations that besides some common features within country they have some specific characteristics. They made the location better or worse off other alternative sites. Therefore, it is important to follow the new economic geography and study the location choices of MNE.

The thesis deals with province-level data and covers still understudied research area of location within the borders of a country. Previous empirical literature did not analyse the regional pattern of FDI. The main interest is on outward FDI and CEECs instead. This study attempts to imply circumstances in which MNEs have motives to undertake international activity in Austria. The research identifies and assesses the contribution of various location factors that may make Austrian provinces more or less attractive as a target for FDI. Additionally, Austria is a specific country. It is a small open economy that is concentrated on services. The same pattern is shared by FDI investors. Thus, it is understandable that knowledge intensive services affect positively the MNE's decision. FDI in Austria may look for specific skills and know-how. This may motivate and be motivated by activeness of business sector in R&D.

The interesting characteristic of Austrian regional distribution of MNE is the concentration in Vienna and surrounding regions. Vienna raises a strong competition due to its market power. As a region it outperforms almost all regions in almost all aspects. 20% of total population in Austria lives on 0,49% of Austrian area. This constructs a huge market and leads to some concentration mechanisms. Wages are at least twice as much in Vienna in comparison to other regions. Vienna outweighs other counties in the level of education. It is a source of 28% of gross value added of services and 30% in gross value added of manufacturing. Vienna receives 50% of all investments in Austria, however, their average value is generally smaller. Vienna is a host location for many investors but with lower capital controlled.

The goal of this study was to verify determinants suggested by literature that affect the location decision. The thesis examines regional differences in receiving FDI in Austria and agglomeration effects. The latter in terms of geography of production does not appear as a significant factor of localization. However, the linkage between present investments and previous international activity was significant under all specifications. The MNEs avoid

locations that have already received considerable amount of FDI. The hypothesis on cost of production was violated by a positive coefficient on wages. It turns out that wage serves in Austria as an indicator of quality of workers. Moreover, unemployment rate, often suggested as a proxy of labour availability comes with negative sign. As it was discovered in OeNB survey, Austria is treated as demand pool. The MNEs locate its foreign subsidiaries close to the consumers. This mitigates cost of transactions. Thus, the higher population density is, the higher agglomeration of international firms.

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APPENDICES

Appendix A. Definitions and sources of data

Variable	Label	Description and source
FDI		
MNE	FDI_no.	Count of affiliates per province in Austria; Oesterreichische Nationalbank (OeNB, 1998-2008)
Inward FDI	FDI	FDI per county in MLN Euro. Oesterreichische Nationalbank (OeNB, 1998-2008) Data referring to 1996-1999 were converted from Austrian Schilling (ATS) to Euro (EUR) at irrevocable Euro conversion rate: EUR 1 = ATS 13.7603
DEMAND CONDITIONS		
Population	POP	Headcount per province, SuperSTAR database, Statistik Austria (Austrian Statistical Office)
Population density	POP_den	Population density is calculated dividing the total population of the region by the area in square kilometres of the region.
Market access in chosen province	MA_P	GDP per capita per county, SuperSTAR database, Statistik Austria (Austrian Statistical Office)
Market access in other provinces	MA_OP	Sum of adjusted GDP per capita of other provinces; GDP per capita is taken from SuperSTAR database, Statistik Austria (Austrian Statistical Office); It is adjusted by distance in km between capital cites of provinces. The distance between capital cities of provinces is calculated at www.mapcrow.info/ and www.indo.com/distance
Market access in neighbouring countries	MA_OC	Sum of adjusted GDP per capita of neighbouring countries: Germany, Czech Republic, Slovak Republic, Hungary, Slovenia, Italy and Switzerland. It is adjusted by distance in km between capital city of country and capital of considered province. GDP per capita was collected from World Bank database, Quick Query. The distance is calculated at www.mapcrow.info/ and www.indo.com/distance
Gross wage	WAGE	Average annual gross wage per county, SuperSTAR database, Statistik Austria (Austrian Statistical Office)
Population 15-64	POP_15_64	OECD Database, Regional Statistic
Unemployment rate	UNEMPLOY_r	SuperSTAR database, Statistik Austria (Austrian Statistical Office)
Tertiary education	EDU_iii	% of labour force with tertiary education level, OECD Database, Regional Statistic
SUPPLY CONDITIONS		
Knowledge intensive services	KIS_serv	% of total services that are knowledge intensive, OECD Database, Regional Statistic
Gross Value Added in Secondary sector	GVA_IIsec	Gross Value Added at basic price in the secondary sector by county, current prices, http://www.statistik.at/web_en/statistics/regional/regional_accounts/nuts_2-regional_gdp_and_main_aggregates/index.html
Gross Value Added in Tertiary sector	GVA_IIIsec	Gross Value Added at basic price in tertiary sector by county, current prices, http://www.statistik.at/web_en/statistics/regional/regional_accounts/nuts_2-regional_gdp_and_main_aggregates/index.html

Variable	Label	Description and source
AGGLOMERATION CONDITIONS		
Number of firms	FIRMno	SuperSTAR database, Statistik Austria (Austrian Statistical Office)
Firm density	FIRMden	Firm's density per 1000 inhabitants, SuperSTAR Database
Manufacturing density	MANUFACTden	Manufacturing employment/area, Manufacturing emplyment from SuperSTAR Database, in km2, SuperSTAR Database
Employees of MNE	LABOR_MNE	Oesterreichische Nationalbank (OeNB, 1998-2008)

Appendix B. Correlation matrix of variables

	fdi_no	**fdi**	**pop**	**pop_den**	**ma_p**	**ma_op**
fdi_no	1					
fdi	0,79	1				
pop	0,66	0,53	1			
pop_den	0,96	0,8	0,49	1		
ma_p	0,71	0,68	0,3	0,71	1	
ma_op	0,25	0,29	0,36	0,19	-0,17	1
ma_oc	0,23	0,41	0,05	0,3	0,16	0,59
wage	0,92	0,82	0,86	0,84	0,66	0,3
pop_15_64	0,68	0,55	1	0,51	0,32	0,35
unemploy_r	0,75	0,76	0,39	0,81	0,48	0,41
edu_iii	0,8	0,77	0,44	0,79	0,86	0,16
know_in_serv	0,86	0,77	0,61	0,85	0,7	0,21
gva_iisec	0,47	0,42	0,92	0,28	0,28	0,26
gva_iiisec	0,95	0,85	0,8	0,88	0,71	0,29
firmden	0,13	0,24	-0,24	0,17	0,69	-0,28
manufactden	0,95	0,75	0,48	0,99	0,69	0,16
	ma_oc	**wage**	**pop_1~64**	**unempl~r**	**edu_iii**	**know_i~v**
ma_oc	1					
wage	0,22	1				
pop_15_64	0,06	0,87	1			
unemploy_r	0,58	0,67	0,41	1		
edu_iii	0,43	0,75	0,46	0,69	1	
know_in_serv	0,36	0,85	0,63	0,75	0,8	1
gva_iisec	0	0,75	0,92	0,21	0,33	0,49
gva_iiisec	0,26	0,99	0,82	0,71	0,8	0,86
firmden	0,15	0,05	-0,22	0,13	0,52	0,17
manufactden	0,25	0,82	0,5	0,77	0,75	0,83

	g~_iisec	g~iiisec	firmden	manufa~n		
gva_iisec	1					
gva_iiisec	0,66	1				
firmden	-0,23	0,14	1			
manufactden	0,28	0,86	0,14	1		

Appendix C. Time effects (Panel Regression Model)

	(1)	(4)	(2)	(5)	(3)	(6)
1998	240.65815**	dropped	-9.3506081	3.0689414	355.11694**	138.7887**
1999	216.0642**	-9.650089*	-34.882094*	-5.4068366	317.12288**	124.09317**
2000	194.75656**	-2.1296942	-56.713961**	1.3772712	285.36834**	119.28938**
2001	165.92866**	-3.0018307	-86.602889**	.53095685	238.74931**	105.62093**
2002	126.02658**	-5.706408	-126.41003**	-1.9213561	182.05338**	89.928787**
2003	105.09819**	-15.665289	-147.81181**	-7.3493018	143.02691**	80.176135**
2004	53.586503**	-30.544485	-198.74161**	-21.404492	89.918285**	55.131165**
2005	41.99287*	-35.598333	-211.63399**	-24.408984	65.324441**	43.954321**
2006	dropped	-64.593781	-254.11218**	-52.072409	dropped	dropped

Appendix D. County effects (Panel Regression Model)

Variable	(4)	(5)	(6)
Carinthia	-1405.8698**	-1624.2111**	-1074.6334**
Lower Austria	-1355.9942**	-1396.5458**	-1133.0855**
Upper Austria	-1431.2605**	-1508.0524**	-1266.0736**
Salzburg	-1275.1857**	-1510.4702**	-960.61271**
Syria	-1552.3208**	-1644.1535**	-1281.1337**
Tyrol	-1467.1461**	-1650.0936**	-1111.8689**
Vorarlberg	-1361.9597**	-1617.2267**	-1047.3389**
Burgenland	-1141.0599**	-1492.6834**	-822.85825**
chi2	176823.26	13424.084	128863.87

p<.1; ** p<.05; *** p<.01

Appendix E. Time effects (Poisson Regression Model)*

	(4)	(5)	(6)
1998	-.01026688	.03307298	-.04558241
1999	.00348609	.04251242	-.03166954
2000	-.01610602	.0394961	-.05046084
2001	-.00457013	.04998871	-.03347506

	(4)	(5)	(6)
2002	.00440094	.0687871	-.02298811
2003	.05570923	.09877992	.0215104
2004	.04034035	.08417332	.01320868
2005	.05801281	.09445134	.04609833
2006		.03455094	
chi2	98.553557	102.00702	102.44641
aic	680.99813	744.99411	678.5066
bic	733.67601	799.98993	728.79003

* year 1996, 1997, and 2006 (in 1 and 3) dropped due to collinearity.

ABSTRAKT

Diese Masterarbeit untersucht die Determinanten der ausländischen Direktinvestionen in den österreichischen Bundesländern in der Periode von 1996 bis 2006. Empirisch testbare Hypothesen werden aus der einschlägigen theoretischen Literatur (new economic geography) hergeleitet. Diese Hypothesen werden anhand eines Poisson panel regression Models getestet. Die Resultate zeigen, dass Marktzugang (market access) and der Bestand an ausländischen Direktinvestionen die wichtigste Rolle spielen.

Schlüsselwort

Multinationale Unternehmen, Internationale Direktinvestitionen, Bestimmungsfaktoren für Internationale Direktinvestitionen-Platzierung, Österreich

ABSTRACT

This master thesis concerns the problem of geographical distribution of FDI within Austrian provinces over the period 1996-2006. The Poisson panel regression model is used to analyse this issue. The thesis investigates the regional determinants of location choice of MNE in Austria and finds that market access and previous FDI are significant factors. MNEs set up close to customers and employees creating agglomerations. FDI concentrates in Vienna and surrounding regions.

Keywords

multinational enterprises, foreign direct investment, determinants of foreign direct investment location, Austria

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